Online Appendix

Breastfeeding and Child Development

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Appendix A: Measurements

Cognitive Development

The first cognitive test is the British Ability Scales (BAS), which is measured directly from the child at ages 3, 5 and 7 (MCS2,3,4). Six different BAS tests have been administered across the MCS sweep. The BAS Naming Vocabulary test is a verbal scale which assesses spoken vocabulary (MCS2,3). Children are shown a series of coloured pictures of objects one at a time which they are asked to name. The scale measures the children's expressive language ability. In the BAS Pattern Construction Test, the child constructs a design by putting together flat squares or solid cubes with black and yellow patterns on each side (MCS3,4). The child's score is based on both speed and accuracy in the task. The BAS Picture Similarity Test assesses pictorial reasoning (MCS3). The BAS Word Reading Test the child reads aloud a series of words presented on a card (MCS4).

The second measure of cognitive ability is the Bracken School Readiness Assessment. This is used to assess the conceptual development of young children across a wide range of categories, each in separate subtests (Bracken 2002). MCS2 employs six of the subtests which specifically evaluate: colours, letters, numbers/counting, sizes, comparisons, and shapes. The test result used is a composite score based on the total number of correct answers across all six subtests.

Non-Cognitive Development

The behavioural development of children is measured using the Strengths and Difficulties Questionnaire (SDQ). This is a validated behavioural screening tool which has been shown to compare well with other measures for identifying hyperactivity and attention problems (Goodman 1997). It consists of 25 items which generate scores for five subscales measuring: conduct problems; hyperactivity;

emotional symptoms; peer problems; and pro-social behaviour. The child's behaviour is reported by a parent, normally the mother, in the computer assisted self-completion module of the questionnaire. At age 4 an age appropriate adapted version of the SDQ was used and at ages 5 and 7 the 4 - 15 years version was used.

Health

Various dimensions of child health are reported by the mother. At the 9-month survey she is asked whether the child has suffered any of the following list of health problems that resulted in him/her being taken to the GP, Health Centre or Health visitor, or to Casualty, or that resulted in a phone call to NHS direct: chest infections, ear infections, wheezing/asthma, skin problems, persistent or severe vomiting, and/or persistent or severe diarrhoea.

At ages 3, 5 and 7, the mother is asked whether the child has any long-standing health condition, asthma (ever), eczema (ever), hay fever (ever) (note eczema and hay fever are pooled at age 3), wheezing/whistling in chest (ever). At age 3 we also observe whether the child has had recurring ear infections.

Maternal Behaviour/Parenting Activities

We measure three dimensions of maternal behaviour and investments. The first is the warmth of the relationship between the mother and child at three years from a self-reported instrument completed by mothers that assesses her perceptions of her relationship with her child (Pianta 1992).

The second is maternal mental health. At child age 9 months, it is measured from the Malaise Inventory (Rutter, Tizard, and Whitmore, 1970), a set of self-completion questions which combine to measure levels of psychological distress, or depression. It is a shortened version of the original 24-item scale that was developed from the Cornell Medical Index Questionnaire which comprises of 195 self-completion questions (Brodman et al. 1952; Brodman, Erdmann, and Wolff 1949). This self completion measure has been used widely in general population studies. In the MCS, the following 9 of the original 24 items of the Malaise Inventory were used: tired most of time; often miserable or depressed; often worried about things; easily upset or irritated; every little thing gets on your nerves and wears you out; often get into a

violent rage; suddenly scared for no good reason; constantly keyed up or jittery; heart often races like mad. Yes/No answers are permitted, making total score of 9. At ages 3, 5 and 7, the Kessler 6 scale was used (Kessler et al. 2003). Both main and partner respondents used a computerised self-completion form. The six questions ask how often in the past 30 days the respondent had felt i) 'so depressed that nothing could cheer you up' ii) 'hopeless' iii) 'restless or fidgety' iv) 'that everything you did was an effort' v) 'worthless' vi) 'nervous'. For each question respondents score between 0 (none of the time) and 3 (most or all of the time) making a total scale of 18.

Finally, we observe the home learning environment (HLE, based on activities carried out with the child in the home, see Bradley 1995) at ages 3, 5 and 7. In particular, at age 3 we observe frequency of: reading to the child, library visits, learn the ABC or alphabet, numbers or counting, songs, poems or nursery rhymes, painting or drawing. At ages 5 and 7 we observe the frequency of: reading, stories, musical activities, drawing/painting, physically active games, indoor games, park/playground. We consider these activities separately (coded as 0/1 dummy variables, where 1=whether the activity took place every day) and also combine the responses on frequency into a score "Home learning environment" ranging from 0 (do not perform any of said activities at all) to 42 (perform each of said activities every day).

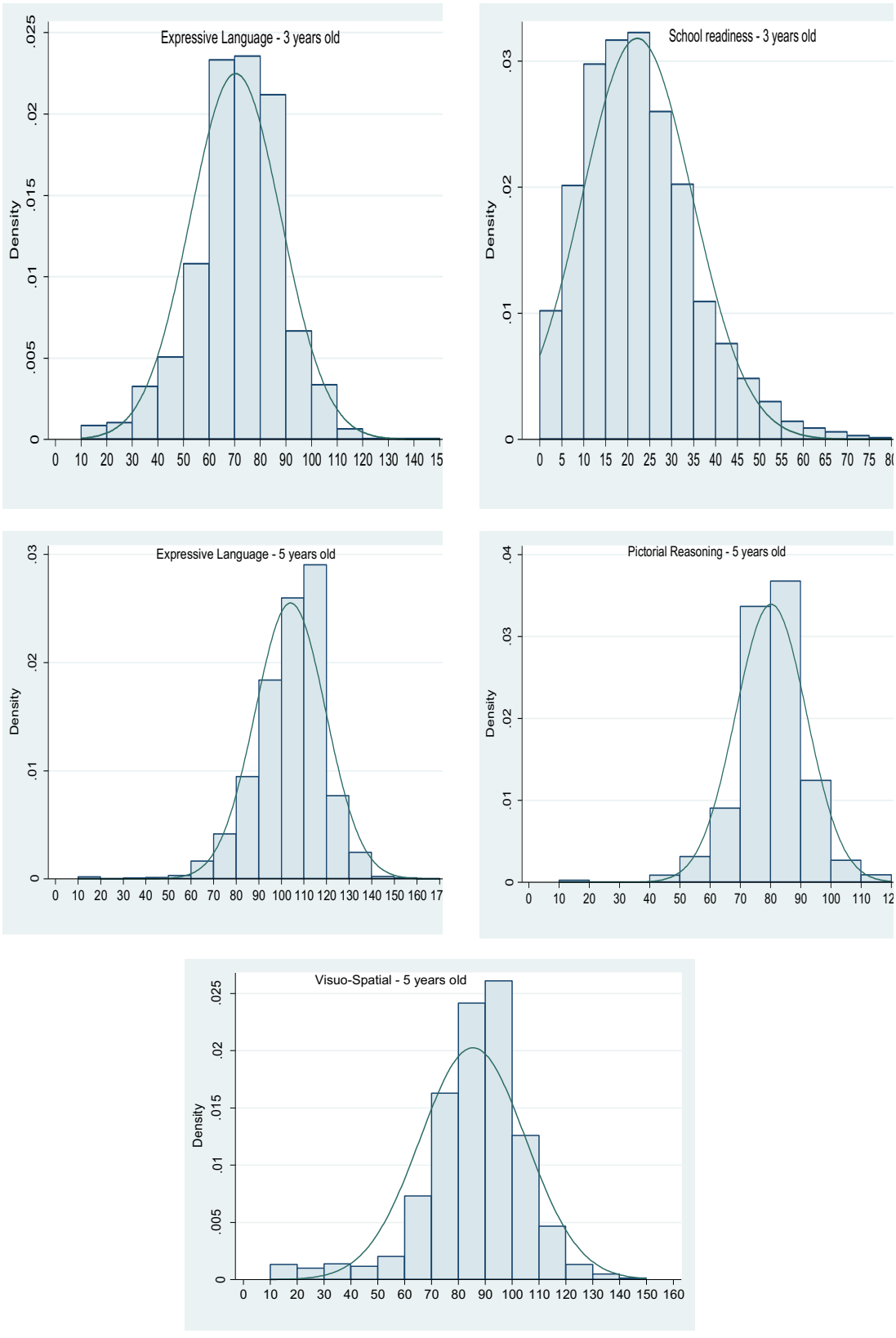

FIGURE A1. HISTOGRAMS OF COGNITIVE MEASURES. LOW EDUCATED MOTHERS.

Notes: Sample excludes Northern Ireland, planned-C, emergency-C, ICU.

Source: Millennium Cohort Study.

Appendix B: Balance

This Appendix expands section IIIC of the paper on the validity of our exclusion restriction. Tables B1 to B3 report balance between our main source of variation and other important events or variables: Table B1 provides the distribution (by day of birth) of emergency C-sections and Intensive Care Unit (ICU) stays, Table B2 extends the balance analysis of Table 2 to additional characteristics included in the MCS dataset, and Table B3 shows the distribution (by day of birth or day of admission) of adverse events to the mother and child within 30 days of discharge as recorded in the Hospital Episode Statistics.

Table B4 explores whether the variation in *Exposure* among cases of induced labour is potentially exogenous or not. As reported in Table 2, we reject at 1% that the correlation between *Exposure* and induced labour is null. This is potentially worrisome because the timing of inductions might not be exogenous. In Table B4, we show results of a series regressions in which induction of labour is the dependent variable. The first column shows that *Exposure* and induction of labour are positively correlated, as we had reported in Table 2. The second column adds to the list of regressors all those of Table 2 and B2 (except the ones related to the child's birth), but with the socio-economic variables combined into an index (SES). The third column includes the same covariates as the second plus interactions of the covariates with *Exposure*.

The second column of the table B4 below shows that the SES index is only weakly correlated with inductions (p=0.107) but most importantly, the correlation between induction and *Exposure* is practically identical to the one on the first column, hence the correlation between induction and Exposure does not reflect socio-demographic differences between those whose labour is induced or not, at least as measured by observed characteristics. To prove this further, the third column shows that neither of the interactions of *Exposure* with the covariates (including the SES index) are statistically significant. Hence, this should provide some reassurance that the variation in exposure among cases of induced labour is exogenous.

In the remaining tables of this Appendix, we show the comparability of babies (and their mothers) according to a cubic polynomial in *Hour* and a dummy variable of *Exposure*. In Tables B5-B8, we show the balance (1) comparing the mothers' and infants' characteristics according to whether their value of *Exposure* is null or positive (2) the p-value of joint significance of the maternal and child characteristics over a third order polynomial of *hour*. In the case of (1), we also report the standardised difference, which is the preferred measure of balance (Imbens and Wooldridge 2009). Standardised differences of 0.2 or larger are usually

considered problematic. Hence, we complement the evidence shown in Tables 2 and B2, in which we showed the balance using the correlation of mothers' and infants' characteristics with *Exposure.*

We also show the balance in other samples of interest using characteristics from the MCS: the sample of high-educated mothers (Tables B9-B14), and the sample of low educated women with emergency C-sections and children in intensive care (Tables B17-B22). In Tables B23-B28, we also report the balance in the sample that we use to obtain our main result (Table 5 col. 1 in the main text), which is different from those in Tables 2 and B2 (and Tables B5 to B8) because of some attrition between the first and subsequent waves.

TABLE B1 — DISTRIBUTION OF EMERGENCY C-SECTIONS AND INTENSIVE CARE UNIT (ICU) STAYS, BY DAY OF BIRTH

	[1]	[2]	[3]	[4]	[5]	[6]
Day of Birth ↓	Emergency Caesarean	ICU	ICU among Vaginal Deliveries	Emergency Caesarean	ICU	ICU among Vaginal Deliveries
				(Difference with respect to Monday)		
Sun	12.03%	8.93%	6.29%	-0.012	0.013	-0.001
				(0.016)	(0.013)	(0.013)
Mon	13.23%	7.62%	6.39%			
Tue	11.82%	7.24%	5.54%	-0.014	-0.004	-0.009
				(0.015)	(0.012)	(0.012)
Wed	12.16%	9.17%	5.08%	-0.011	0.016	-0.013
				(0.015)	(0.012)	(0.012)
Thurs	13.49%	9.34%	6.03%	0.003	0.017	-0.004
				(0.015)	(0.012)	(0.012)
Fri	11.12%	8.82%	6.58%	-0.021	0.012	0.002
				(0.015)	(0.012)	(0.012)
Sat	11.12%	7.25%	5.53%	-0.021	-0.004	-0.009
				(0.015)	(0.012)	(0.012)
P-value Joint	0.56	0.31	0.85	0.556	0.313	0.845
P-value Fri-Sun	0.44	0.42	0.82	0.442	0.416	0.815
Observations	7,058	7,058	5,566	7,058	7,058	5,566

Notes: Columns 1 to 3 show, by day of birth, the distribution of the variable listed in the heading of each column. Columns 4 to 6 show estimates from separate OLS regressions (Monday omitted). Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through planned caesarean section. Standard errors in parentheses.

Source : Millennium Cohort Study.

TABLE B2 — BALANCE BY EXPOSURE TO WEEKEND (CONTINOUS) - LOW EDUCATED MOTHERS

Variable	Correlation with Exposure	P-value	Variable	Correlation w/ Exp. to Weekend	P-value
Mother's characteristics			Presence of rubbish and litter in the area		
Mother's Mother is still alive	-0.013	0.330	Very common	-0.008	0.550
Lived away from home before 17	-0.011	0.407	Fairly common	0.000	0.977
If mother has ever had			Not very common	0.010	0.460
Migraine	0.005	0.728	Not at all common	-0.004	0.768
Hay fever or persistent runny rose	-0.033	0.011	Vandalism and damage to property in the area		
Bronchitis	0.004	0.782	Very common	0.003	0.802
Asthma	-0.002	0.879	Fairly common	0.003	0.829
Eczema	0.010	0.443	Not very common	-0.005	0.699
Back Pain/lumbago/sciatica	-0.017	0.188	Not at all common	0.001	0.947
Fits/convulsions/epilepsy	-0.030	0.024	Garden		
Diabetes	-0.001	0.956	Own garden	-0.008	0.553
Cancer	-0.014	0.289	Shared garden	-0.003	0.805
Digestive or Bowel disorders	-0.039	0.003	Social Assistance		
Diabetes during pregnancy	-0.001	0.912	Child Tax Credit	-0.007	0.609
Live in house	0.004	0.771	Working Families Tax Credit	0.001	0.961
# rooms	-0.006	0.644	Income Support	-0.002	0.901
Own outright	0.001	0.955	Jobseekers Allowance	-0.013	0.311
Rent from Local Authority	0.014	0.295	Housing Benefit	0.024	0.068
Rent from Housing Association	0.001	0.951	Council Tax Benefit	0.025	0.060
Rent privately	-0.004	0.736	Invalid Care Allowance	-0.011	0.416
Live with parents	0.010	0.448	***Delivery***		
Live rent free	-0.005	0.691	Type Delivery:		
Heating			Normal	-0.014	0.277
Open fire	0.005	**0.698**	Forceps	0.015	0.245
Gas/electric fire	-0.006	0.643	Vacuum	0.003	0.819
Central	-0.011	0.407	Other	0.025	0.059
No heating	0.004	0.754	Labour duration (hours)	0.003	0.792
Damp or condensation at home	-0.016	0.222	Pain relief: Gas and air	0.007	0.576
Assets			Pain relief: Pethidine	0.008	0.526
Telephone	-0.009	0.499	Pain relief: Epidural	0.020	0.136
Dishwasher	-0.007	0.610	Pain relief: General anaesthetic	0.015	0.268
Own computer	-0.012	0.355	Pain relief: TENS	0.004	0.748
Tumble dryer	-0.006	0.647	Pain relief: Other	0.010	0.441
Own/access to car	-0.008	0.525	Complication: Breech	0.005	0.677
Noisy Neighbours			Complication: Other abnormal	0.008	0.551
Very common	-0.020	0.121	Complication: Very long labour	0.009	0.509
Fairly common	0.022	0.100	Complication: Very rapid labour	-0.017	0.192
Not very common	0.001	0.922	Complication: Foetal distress (heart)	-0.007	0.584
Not at all common	-0.004	0.769	Complication: Foetal distress (meconium)	-0.016	0.212
			Complication: Other	0.012	0.357

Notes: Figures report the correlation between the variable to the left and the Exposure variable, as well as the P-value that the correlation is equal to zero. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms.

Source: Millennium Cohort Study.

TABLE B3 —ADVERSE EVENTS WITHIN 30 DAYS OF DISCHARGE

	Excluding planned c-sections (%)			Excluding all c-sections and babies in intensive care (%)		
	Babies deaths and hospital readmissions (2000-01)	Mother deaths and hospital readmissions (2000-01)	Babies hosptial outpatient appointments (2003-04)	Babies deaths and hospital readmissions (2000-01)	Mother deaths and hospital readmissions (2000-01)	Babies hosptial outpatient appointments (2003-04)
Monday	3.89	0.90	2.36	3.73	0.86	2.22
Tuesday	3.89	0.92	2.49	3.70	0.87	2.30
Wednesday	3.97	0.90	2.40	3.81	0.85	2.20
Thursday	4.01	0.98	2.41	3.84	0.94	2.17
Friday	3.87	0.91	2.47	3.74	0.89	2.27
Saturday	3.96	0.88	2.38	3.76	0.86	2.19
Sunday	4.03	0.90	2.45	3.85	0.83	2.29
Average weekday	3.94	0.93	2.42	3.77	0.88	2.22
Average weekend (Fri.-Sun.)	3.95	0.90	2.44	3.78	0.86	2.25
P-value	0.89	0.36	0.65	0.90	0.46	0.54
Observations	491,351	497,126	537,058	450,663	450,837	471,979

Notes: The P-value refers to the difference between the weekday and weekend rate. The 2003-04 outpatient dataset has been released under "experimental status" and might suffer quality problems.

Source: Authors' own computations using the Hospital Episode Statistics for births between 1st September 2000 and 31st August 2001, or between 1st September 2003 and 31st August 2004.

TABLE B4 — RELATION BETWEEN LABOUR INDUCTION, EXPOSURE, AND SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS. LOW EDUCATED MOTHERS.

	Without controls	With controls	With controls and their interaction with Exposure
Exposure	0.062	0.065	-0.649
	(0.0152)	(0.0150)	(0.630)
SES index		0.013	0.008
		(0.00807)	(0.0116)
Exposure*SES index			0.011
			(0.0205)
P-value interaction between SES Index and Exposure			0.608
P-value interaction between Antenatal variables and Exposure			0.695
P-value interaction between Birth related variables and Exposure			0.754
P-value interaction between mothers' age, ethnicity, and religion with Exposure			0.689
P-value interaction between mother's health varibles and Exposure			0.283
P-value interaction between all variables (including SES index) and Exposure			0.694

Notes: Robust standard errors in parenthesis. Dependent variable is induction of labour. The socio-economic (SES) index is computed using mother's welfare benefits, labour supply during pregnancy, education, assets, and housing conditions. Column 2 and 3 also include as controls those variables in Table 2 and Appendix Table B2 (except the ones related to type of delivery, pain relief, and complications at birth) which are not combined in the socio-economic index. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery.

Source: Millennium Cohort Study.

TABLE B5 — BALANCE BY CUBIC POLYNOMIAL IN HOUR - LOW EDUCATED MOTHERS

Variable	p-value	Variable	p-value
Antenatal		Back Pain/lumbago/sciatica	0.528
Received ante-natal care	0.663	Fits/convulsions/epilepsy	0.108
First ante-natal was before:		Diabetes	0.914
0-11 weeks	0.737	Cancer	0.557
12-13 weeks	0.442	Digestive or Bowel disorders	0.034
≥ 14 weeks	0.997	Diabetes during pregnancy	0.952
Don't know	0.366		
Attended ante-natal classes	0.495	*Mothers Socioeconomic Status*	
Received fertility treatment	0.154	Working during pregnancy	0.223
Planned parenthood	0.826	Live in house	0.399
		# rooms	0.406
Baby		Own outright	0.829
Female	0.605	Rent from Local Authority	0.615
Birth weight (kg)	0.618	Rent from Housing Association	0.188
Premature	0.558	Rent privately	0.735
Length of gestation (days)	0.416	Live with parents	0.627
Present at birth		Live rent free	0.118
Father	0.699	Heating	
Mother's friend	0.540	Open fire	0.696
Grandmother (in law)	0.489	Gas/electric fire	0.453
Someone else	0.518	Central	0.037
		No heating	0.575
Mothers Demographics		Damp or condensation at home	0.116
Age	0.685	Assets	
Had attained expected educ qual. at age 16	0.863	Telephone	0.091
Married	0.454	Dishwasher	0.925
Religion		Own computer	0.823
No religion	0.689	Tumble dryer	0.940
Catholic	0.398	Own/access to car	0.684
Protestant	0.805	Noisy Neighbours	
Anglican	0.924	Very common	0.274
Another type of Christian	0.997	Fairly common	0.265
Hindu	0.993	Not very common	0.622
Muslim	0.137	Not at all common	0.599
Other	0.727	Presence of rubbish and litter in the area	
Ethnicity		Very common	0.730
White	0.601	Fairly common	0.979
Mixed	0.158	Not very common	0.853
Indian	0.536	Not at all common	0.709
Pakistani/Bangladeshi	0.137	Vandalism and damage to property in the area	
Black	0.860	Very common	0.866
Other	0.430	Fairly common	0.936
Mother's Mother is still alive	0.605	Not very common	0.753
Lived away from home before 17	0.500	Not at all common	0.852
		Garden	
Mothers Health and Lifestyle		Own garden	0.298
Smoked during pregnancy (# avg. cig per day)	0.490	Shared garden	0.963
Drank during pregnancy	0.213	Social Assistance	
Longstanding illness	0.736	Child Tax Credit	0.372
Limiting longstanding illness	0.356	Working Families Tax Credit	0.690
If mother has ever had		Income Support	0.863
Migraine	0.911	Jobseekers Allowance	0.087
Hay fever or persistent runny rose	0.054	Housing Benefit	0.080
Bronchitis	0.562	Council Tax Benefit	0.092
Asthma	0.983	Invalid Care Allowance	0.632
Eczema	0.099		

Notes: Each cell reports the P-value of the joint hypothesis that the coefficients of a cubic polynomial in hour are jointly zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms.

Source: Millennium Cohort Study.

TABLE B6 — BALANCE BY EXPOSURE TO WEEKEND (BINARY) - LOW EDUCATED MOTHERS

Variable	Exposure > 0	Exposure = 0	p-value diff	Std. Difference	Variable	Exposure > 0	Exposure = 0	p-value diff	Std. Difference
Antenatal					Back Pain/lumbago/sciatica	0.206	0.229	0.054	-0.039
Received ante-natal care	0.949	0.955	0.343	-0.019		0.023	0.033	0.045	-0.042
First ante-natal was before:					Fits/convulsions/epilepsy				
0-11 weeks	0.395	0.404	0.525	-0.013	Diabetes	0.011	0.010	0.763	0.006
12-13 weeks	0.340	0.340	0.973	-0.001	Cancer	0.010	0.011	0.556	-0.012
≥ 14 weeks	0.188	0.184	0.716	0.007	Digestive or Bowel disorders	0.074	0.084	0.186	-0.027
Don't know	0.027	0.027	0.936	-0.002	Diabetes during pregnancy	0.008	0.006	0.420	0.016
Attended ante-natal classes	0.243	0.244	0.919	-0.002					
Received fertility treatment	0.014	0.016	0.600	-0.011	*Mothers Socioeconomic Status*				
Planned parenthood	0.453	0.449	0.776	0.006	Working during pregnancy	0.501	0.522	0.137	-0.030
					Live in house	0.829	0.818	0.309	0.021
Baby					# rooms	5.011	5.034	0.546	-0.012
Female	0.500	0.486	0.310	0.021	Own outright	0.028	0.024	0.475	0.014
Birth weight (kg)	3.362	3.350	0.393	0.017	Rent from Local Authority	0.293	0.280	0.299	0.021
Premature	0.046	0.044	0.746	0.007	Rent from Housing Association	0.101	0.110	0.337	-0.020
Length of gestation (days)	279.0	279.3	0.432	-0.016	Rent privately	0.097	0.104	0.386	-0.018
Present at birth					Live with parents	0.058	0.056	0.821	0.005
Father	0.795	0.789	0.592	0.011	Live rent free	0.016	0.019	0.356	-0.019
Mother's friend	0.048	0.052	0.509	-0.013	Heating				
Grandmother (in law)	0.251	0.247	0.757	0.006	Open fire	0.035	0.033	0.650	0.009
Someone else	0.110	0.110	0.964	0.001	Gas/electric fire	0.306	0.301	0.711	0.007
					Central	0.884	0.895	0.197	-0.026
Mothers Demographics					No heating	0.011	0.007	0.184	0.026
Age	26.446	26.496	0.771	-0.006	Damp or condensation at home	0.159	0.179	0.060	-0.038
Expected educ. at age 16	0.564	**0.570**	0.713	-0.007	Assets				
Married	0.447	0.460	0.370	-0.018	Telephone	0.943	0.940	0.607	0.010
Religion					Dishwasher	0.194	0.196	0.895	-0.003
No religion	0.557	0.549	0.604	0.010	Own computer	0.388	0.386	0.878	0.003
Catholic	0.045	0.041	0.517	0.013	Tumble dryer	0.593	0.596	0.815	-0.005
Protestant	0.023	0.031	0.081	-0.036	Own/access to car	0.729	0.727	0.839	0.004
Anglican	0.094	0.097	0.729	-0.007	Noisy Neighbours				
Another type of Christian	0.035	0.038	0.603	-0.011	Very common	0.087	0.094	0.438	-0.016
Hindu	0.010	0.009	0.618	0.010	Fairly common	0.124	0.116	0.359	0.018
Muslim	0.066	0.072	0.428	-0.016	Not very common	0.396	0.405	0.522	-0.013
Other	0.009	0.007	0.493	0.014	Not at all common	0.392	0.385	0.620	0.010
Ethnicity					Presence of rubbish and litter in the area				
White	0.845	0.838	0.476	0.014	Very common	0.151	0.153	0.835	-0.004
Mixed	0.012	0.009	0.255	0.022	Fairly common	0.220	0.226	0.632	-0.010
Indian	0.021	0.022	0.731	-0.007	Not very common	0.364	0.375	0.435	-0.016
Pakistani/Bangladeshi	0.081	0.089	0.304	-0.021	Not at all common	0.264	0.246	0.133	0.030
					Vandalism and damage to property in the area				
Black	0.028	0.031	0.565	-0.012	Very common	0.111	0.107	0.680	0.008
Other	0.013	0.011	0.554	0.012	Fairly common	0.156	0.168	0.270	-0.022
Mother's Mother is still alive	0.930	0.936	0.427	-0.016	Not very common	0.399	0.403	0.745	-0.007
Lived away from home before 17	0.200	0.212	0.299	-0.021	Not at all common	0.334	0.322	0.348	0.019
					Garden				
Mothers Health and Lifestyle					Own garden	0.823	0.820	0.777	0.006
Smoked during pregnancy (# avg. cig. per day)	3.590	3.624	0.842	-0.004	Shared garden	0.044	0.047	0.589	-0.011
Drank during pregnancy	0.246	0.250	0.718	-0.007	Social Assistance				
Longstanding illness	0.201	0.201	0.944	0.001	Child Tax Credit	0.129	0.128	0.987	0.000
Limiting longstanding illness	0.102	0.089	0.115	0.031	Working Families Tax Credit	0.245	0.251	0.594	-0.011
If mother has ever had					Income Support	0.299	0.301	0.865	-0.003
Migraine	0.222	0.218	0.689	0.008	Jobseekers Allowance	0.044	0.047	0.648	-0.009
Hay fever or persistent runny rose	0.228	0.258	0.017	-0.048	Housing Benefit	0.260	0.246	0.260	0.023
Bronchitis	0.071	0.067	0.545	0.012	Council Tax Benefit	0.243	0.228	0.222	0.025
Asthma	0.172	0.180	0.471	-0.015	Invalid Care Allowance	0.015	0.013	0.651	0.009
Eczema	0.181	0.181	0.974	-0.001					

Notes: Figures in columns titled "Exposure>0" and "Exposure=0" are sample means of the variable listed under the column titled "Variable". The p-value of the test of the difference between the two means is shown under the column titled "p-value diff". The standarized difference of the difference between the two means is shown under the colum titled "Std. Difference." Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms. Number of observations 5,810.

Source: Millennium Cohort Study.

TABLE B7 — BALANCE BY CUBIC POLYNOMIAL IN HOUR - LOW EDUCATED MOTHERS

Variable	p-value
Delivery	
Labour induced	0.000
Labour duration (hours)	0.335
Type Delivery:	
Normal	0.148
Forceps	0.392
Vacuum	0.562
Other	0.426
Pain relief:	
None	0.283
Gas and air	0.293
Pethidine	0.541
Epidural	0.052
General anaesthetic	0.353
TENS	0.922
Other	0.720
Complication:	
None	0.938
Breech	0.916
Other abnormal	0.357
Very long labour	0.709
Very rapid labour	0.382
Foetal distress (heart)	0.598
Foetal distress (meconium)	0.586
Other	0.614

Notes: Each cell reports the P-value of the joint hypothesis that the coefficients of a cubic polynomial in hour are jointly zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of labour duration.

Source: Millennium Cohort Study.

TABLE B8 — BALANCE BY EXPOSURE TO WEEKEND (BINARY) - LOW EDUCATED

Variable	Exposure > 0	Exposure = 0	p-value diff	Standardised Difference
Delivery				
Labour induced	0.313	0.289	0.063	0.037
Labour duration (hours)	8.830	8.780	0.864	0.003
Type Delivery:				
Normal	0.902	0.899	0.761	0.006
Forceps	0.039	0.035	0.481	0.014
Vacuum	0.063	0.067	0.561	-0.012
Other	0.008	0.006	0.420	0.016
Pain relief:				
None	0.100	0.106	0.470	-0.015
Gas and air	0.796	0.792	0.742	0.007
Pethidine	0.356	0.361	0.704	-0.008
Epidural	0.206	0.198	0.484	0.014
General anaesthetic	0.003	0.001	0.120	0.029
TENS	0.073	0.073	0.981	0.000
Other	0.035	0.030	0.348	0.019
Complication:				
None	0.761	0.760	0.941	0.001
Breech	0.003	0.004	0.556	-0.012
Other abnormal	0.020	0.019	0.799	0.005
Very long labour	0.049	0.045	0.507	0.013
Very rapid labour	0.024	0.028	0.396	-0.017
Foetal distress (heart)	0.071	0.076	0.479	-0.014
Foetal distress (meconium)	0.037	0.040	0.586	-0.011
Other	0.081	0.074	0.373	0.018

Notes: Figures in columns titled "Exposure>0" and "Exposure=0" are sample means of the variable listed under the column titled "Variable". The p-value of the test of the difference between the two means is shown under the column titled "p-value diff". The standarized difference of the difference between the two means is shown under the colum titled "Std. Difference." Sample comprises low educated mothers, and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. All variables are dummy variables, with the exception of labour duration.

Source: Millennium Cohort Study.

TABLE B9 — BALANCE BY CUBIC POLYNOMIAL IN HOUR - SUBSAMPLE OF HIGH EDUCATED MOTHERS

Variable	p-value	Variable	p-value
Antenatal		Back Pain/lumbago/sciatica	0.618
Received ante-natal care	0.379	Fits/convulsions/epilepsy	0.804
First ante-natal was before:		Diabetes	0.619
0-11 weeks	0.935	Cancer	0.512
12-13 weeks	0.482	Digestive or Bowel disorders	0.259
≥ 14 weeks	0.247	Diabetes during pregnancy	0.925
Don't know	0.377		
Attended ante-natal classes	0.841	*Mothers Socioeconomic Status*	
Received fertility treatment	0.775	Working during pregnancy	0.928
Planned parenthood	0.035	Live in house	0.789
		# rooms	0.202
Baby		Own outright	0.728
Female	0.241	Rent from Local Authority	0.158
Birth weight (kg)	0.911	Rent from Housing Association	0.517
Premature	0.981	Rent privately	0.052
Length of gestation (days)	0.477	Live with parents	0.237
Present at birth		Live rent free	0.633
Father	0.320	Heating	
Mother's friend	0.504	Open fire	0.707
Grandmother (in law)	0.032	Gas/electric fire	0.002
Someone else	0.196	Central	0.575
		No heating	0.731
Mothers Demographics		Damp or condensation at home	0.377
Age	0.642	Assets	
High education (NVQ level 4 or more)	0.995	Telephone	0.900
Married	0.162	Dishwasher	0.497
Religion		Own computer	0.578
No religion	0.760	Tumble dryer	0.145
Catholic	0.537	Own/access to car	0.527
Protestant	0.681	Noisy Neighbours	
Anglican	0.434	Very common	0.713
Another type of Christian	0.223	Fairly common	0.326
Hindu	0.864	Not very common	0.294
Muslim	0.831	Not at all common	0.464
Other	0.596	Presence of rubbish and litter in the area	
Ethnicity		Very common	0.608
White	0.049	Fairly common	0.859
Mixed	0.182	Not very common	0.543
Indian	0.758	Not at all common	0.780
Pakistani/Bangladeshi	0.674	Vandalism and damage to property in the area	
Black	0.111	Very common	0.531
Other	0.713	Fairly common	0.400
Mother's Mother is still alive	0.363	Not very common	0.630
Lived away from home before 17	0.759	Not at all common	0.513
		Garden	
Mothers Health and Lifestyle		Own garden	0.792
Smoked during pregnancy (# avg. cig per day)	0.249	Shared garden	0.497
Drank during pregnancy	0.938	Social Assistance	
Longstanding illness	0.847	Child Tax Credit	0.138
Limiting longstanding illness	0.678	Working Families Tax Credit	0.960
If mother has ever had		Income Support	0.710
Migraine	0.711	Jobseekers Allowance	0.957
Hay fever or persistent runny rose	0.331	Housing Benefit	0.527
Bronchitis	0.823	Council Tax Benefit	0.908
Asthma	0.145	Invalid Care Allowance	0.738
Eczema	0.906		

Notes: Each cell reports the P-value of the joint hypothesis that the coefficients of a cubic polynomial in hour are jointly zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". Sample comprises high educated mothers (NVQ level 3 or more), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms.

Source: Millennium Cohort Study.

TABLE B10 — BALANCE BY EXPOSURE TO WEEKEND (CONTINOUS) - SUBSAMPLE OF HIGH EDUCATED MOTHERS

Variable	Correlation with Exposure	P-value	Variable	Correlation with Exposure	P-value
Antenatal			Back Pain/lumbago/sciatica	-0.016	0.244
Received ante-natal care	-0.011	0.428	Fits/convulsions/epilepsy	0.006	0.663
First ante-natal was before:			Diabetes	-0.013	0.335
0-11 weeks	0.000	0.988	Cancer	0.019	0.157
12-13 weeks	-0.009	0.510	Digestive or Bowel disorders	-0.025	0.069
≥ 14 weeks	0.000	0.982	Diabetes during pregnancy	0.002	0.907
Don't know	0.019	0.167			
Attended ante-natal classes	0.015	0.278	*Mothers Socioeconomic Status*		
Received fertility treatment	-0.013	0.347	Working during pregnancy	0.013	0.353
Planned parenthood	-0.037	0.006	Live in house	0.000	0.983
			# rooms	0.006	0.636
Baby			Own outright	-0.015	0.287
Female	0.025	0.071	Rent from Local Authority	-0.018	0.191
Birth weight (kg)	0.004	0.755	Rent from Housing Association	0.016	0.232
Premature	-0.006	0.684	Rent privately	0.003	0.808
Length of gestation (days)	0.020	0.149	Live with parents	-0.017	0.203
Present at birth			Live rent free	0.015	0.284
Father	0.004	0.768	Heating		
Mother's friend	-0.018	0.180	Open fire	0.003	0.851
Grandmother (in law)	0.032	0.020	Gas/electric fire	0.023	0.087
Someone else	0.014	0.320	Central	-0.011	0.428
			No heating	0.010	0.476
Mothers Demographics			Damp or condensation at home	-0.022	0.113
Age	-0.016	0.244	Assets		
High education (NVQ level 4 or more)	0.008	0.580	Telephone	-0.007	0.620
Married	-0.030	0.028	Dishwasher	0.004	0.795
Religion			Own computer	0.018	0.189
No religion	-0.005	0.737	Tumble dryer	0.028	0.038
Catholic	-0.019	0.156	Own/access to car	-0.013	0.356
Protestant	0.015	0.269	Noisy Neighbours		
Anglican	0.007	0.591	Very common	0.001	0.951
Another type of Christian	0.017	0.226	Fairly common	0.010	0.477
Hindu	0.015	0.285	Not very common	-0.019	0.164
Muslim	-0.004	0.747	Not at all common	0.013	0.357
Other	-0.004	0.789	Presence of rubbish and litter in the area		
Ethnicity			Very common	-0.001	0.967
White	0.031	0.023	Fairly common	-0.005	0.734
Mixed	-0.028	0.044	Not very common	-0.004	0.759
Indian	-0.006	0.669	Not at all common	0.008	0.541
Pakistani/Bangladeshi	-0.008	0.547	Vandalism and damage to property in the area		
Black	-0.029	0.034	Very common	-0.013	0.356
Other	-0.002	0.902	Fairly common	-0.009	0.524
Mother's Mother is still alive	0.021	0.132	Not very common	-0.010	0.476
Lived away from home before 17	0.003	0.826	Not at all common	0.021	0.123
			Garden		
Mothers Health and Lifestyle			Own garden	-0.001	0.928
Smoked during pregnancy (# avg. cig per day)	0.017	0.210	Shared garden	0.008	0.545
Drank during pregnancy	0.005	0.705	Social Assistance		
Longstanding illness	0.012	0.383	Child Tax Credit	-0.024	0.082
Limiting longstanding illness	0.006	0.673	Working Families Tax Credit	0.007	0.629
If mother has ever had			Income Support	-0.005	0.719
Migraine	-0.007	0.627	Jobseekers Allowance	-0.002	0.867
Hay fever or persistent runny rose	-0.011	0.405	Housing Benefit	-0.011	0.410
Bronchitis	-0.007	0.614	Council Tax Benefit	0.003	0.851
Asthma	0.008	0.582	Invalid Care Allowance	0.009	0.512
Eczema	-0.011	0.436			

Notes: Figures report the correlation between the variable to the left and the Exposure variable, as well as the P-value that the correlation is equal to zero. Sample comprises high educated mothers (NVQ level 3 or more), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms.

Source: Millennium Cohort Study.

TABLE B11 — BALANCE BY EXPOSURE TO WEEKEND (BINARY) - SUBSAMPLE OF HIGH EDUCATED MOTHERS

Variable	Exposure > 0	Exposure = 0	p-value diff	Std. Difference
Antenatal				
Received ante-natal care	0.975	0.979	0.298	-0.022
First ante-natal was before:				
0-11 weeks	0.442	0.434	0.576	0.012
12-13 weeks	0.358	0.379	0.150	-0.031
≥ 14 weeks	0.153	0.147	0.520	0.014
Don't know	0.021	0.020	0.796	0.005
Attended ante-natal classes	0.428	0.417	0.423	0.017
Received fertility treatment	0.023	0.022	0.786	0.006
Planned parenthood	0.615	0.657	0.004	-0.061
Baby				
Female	0.508	0.486	0.149	0.031
Birth weight (kg)	3.431	3.439	0.614	-0.011
Premature	0.026	0.028	0.616	-0.011
Length of gestation (days)	280.249	280.045	0.482	0.015
Present at birth				
Father	0.898	0.886	0.199	0.027
Mother's friend	0.028	0.037	0.104	-0.035
Grandmother (in law)	0.142	0.121	0.030	0.045
Someone else	0.068	0.058	0.158	0.029
Mothers Demographics				
Age	29.277	29.463	0.244	-0.025
High education (NVQ level 4 or more)	0.675	0.695	0.157	-0.031
Married	0.697	0.725	0.038	-0.044
Religion				
No religion	0.380	0.379	0.980	0.001
Catholic	0.069	0.070	0.899	-0.003
Protestant	0.047	0.041	0.358	0.019
Anglican	0.125	0.137	0.263	-0.024
Another type of Christian	0.079	0.066	0.094	0.035
Hindu	0.019	0.019	0.924	0.002
Muslim	0.073	0.078	0.565	-0.012
Other	0.017	0.016	0.811	0.005
Ethnicity				
White	0.810	0.795	0.228	0.026
Mixed	0.009	0.016	0.052	-0.043
Indian	0.038	0.037	0.914	0.002
Pakistani/Bangladeshi	0.073	0.077	0.572	-0.012
Black	0.043	0.044	0.799	-0.005
Other	0.028	0.030	0.660	-0.009
Mother's Mother is still alive	0.944	0.928	0.032	0.047
Lived away from home before 17	0.117	0.113	0.664	0.009
Mothers Health and Lifestyle				
Smoked during pregnancy (# avg. cig per day)	1.271	1.175	0.376	0.019
Drank during pregnancy	0.328	0.334	0.708	-0.008
Longstanding illness	0.186	0.183	0.792	0.006
Limiting longstanding illness	0.073	0.077	0.595	-0.011
If mother has ever had				
Migraine	0.192	0.203	0.348	-0.020
Hay fever or persistent runny rose	0.255	0.263	0.547	-0.013
Bronchitis	0.079	0.080	0.901	-0.003
Asthma	0.151	0.149	0.895	0.003
Eczema	0.172	0.172	0.971	-0.001
Back Pain/lumbago/sciatica	0.194	0.200	0.582	-0.012
Fits/convulsions/epilepsy	0.021	0.016	0.168	0.028
Diabetes	0.009	0.013	0.192	-0.029
Cancer	0.009	0.006	0.243	0.024
Digestive or Bowel disorders	0.086	0.095	0.333	-0.021
Diabetes during pregnancy	0.008	0.009	0.896	-0.003
Mothers Socioeconomic Status				
Working during pregnancy	0.722	0.737	0.262	-0.024
Live in house	0.862	0.855	0.473	0.015
# rooms	5.586	5.590	0.931	-0.002
Own outright	0.042	0.044	0.732	-0.007
Rent from Local Authority	0.105	0.103	0.808	0.005
Rent from Housing Association	0.056	0.049	0.297	0.022
Rent privately	0.072	0.054	0.012	0.052
Live with parents	0.038	0.040	0.664	-0.009
Live rent free	0.020	0.018	0.543	0.013
Heating				
Open fire	0.063	0.061	0.793	0.006
Gas/electric fire	0.264	0.236	0.030	0.046
Central	0.929	0.932	0.703	-0.008
No heating	0.006	0.007	0.726	-0.008
Damp at home	0.114	0.120	0.528	-0.013
Assets				
Telephone	0.981	0.984	0.357	-0.019
Dishwasher	0.392	0.401	0.543	-0.013
Own computer	0.657	0.661	0.828	-0.005
Tumble dryer	0.624	0.602	0.127	0.032
Own/access to car	0.892	0.901	0.318	-0.021
Noisy Neighbours				
Very common	0.049	0.048	0.843	0.004
Fairly common	0.091	0.083	0.388	0.018
Not very common	0.379	0.389	0.497	-0.014
Not at all common	0.481	0.480	0.925	0.002
Presence of rubbish and litter in the area				
Very common	0.091	0.089	0.785	0.006
Fairly common	0.192	0.181	0.365	0.019
Not very common	0.362	0.377	0.305	-0.022
Not at all common	0.355	0.353	0.889	0.003
Vandalism and damage to property in the area				
Very common	0.050	0.049	0.934	0.002
Fairly common	0.133	0.127	0.566	0.012
Not very common	0.387	0.398	0.424	-0.017
Not at all common	0.431	0.425	0.716	0.008
Garden				
Own garden	0.860	0.850	0.354	0.020
Shared garden	0.038	0.048	0.094	-0.036
Social Assistance				
Child Tax Credit	0.181	0.202	0.078	-0.038
Working Families Tax Credit	0.166	0.161	0.684	0.009
Income Support	0.103	0.088	0.092	0.035
Jobseekers Allowance	0.025	0.024	0.890	0.003
Housing Benefit	0.098	0.088	0.279	0.023
Council Tax Benefit	0.094	0.078	0.061	0.039
Invalid Care Allowance	0.009	0.009	0.871	-0.003

Notes: Figures in columns titled "Exposure>0" and "Exposure=0" are sample means of the variable listed under the column titled "Variable". The p-value of the test of the difference between the two means is shown under the column titled "p-value diff". The standarized difference of the difference between the two means is shown under the colum titled "Std. Difference". Sample comprises high educated mothers (NVQ level 3 or more), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms.

Source: Millennium Cohort Study.

TABLE B12 — BALANCE BY CUBIC POLYNOMIAL IN HOUR - SUBSAMPLE OF HIGH EDUCATED MOTHERS

Variable	p-value
Delivery	
Labour induced	0.000
Labour duration (hours)	0.880
Type Delivery:	
Normal	0.793
Forceps	0.970
Vacuum	0.804
Other	0.103
Pain relief:	
None	0.257
Gas and air	0.033
Pethidine	0.159
Epidural	0.400
General anaesthetic	0.299
TENS	0.560
Other	0.725
Complication:	
None	0.913
Breech	0.808
Other abnormal	0.993
Very long labour	0.534
Very rapid labour	0.920
Foetal distress (heart)	0.474
Foetal distress (meconium)	0.327
Other	0.955

Notes: Each cell reports the P-value of the joint hypothesis that the coefficients of a cubic polynomial in hour are jointly zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". Sample comprises high educated mothers (NVQ level 3 or more), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of labour duration.

Source: Millennium Cohort Study.

TABLE B13 — BALANCE BY EXPOSURE (CONTINUOUS) TO WEEKEND - SUBSAMPLE OF HIGH EDUCATED MOTHERS

Variable	Correlation with Exposure	p-value
Delivery		
Labour induced	0.063	0.000
Labour duration (hours)	0.010	0.455
Type Delivery:		
Normal	0.007	0.604
Forceps	0.002	0.909
Vacuum	-0.003	0.839
Other	-0.027	0.045
Pain relief:		
None	-0.019	0.170
Gas and air	0.038	0.006
Pethidine	0.028	0.043
Epidural	0.017	0.214
General anaesthetic	0.007	0.595
TENS	-0.012	0.374
Other	0.001	0.917
Complication:		
None	0.008	0.579
Breech	0.011	0.411
Other abnormal	-0.005	0.698
Very long labour	-0.004	0.785
Very rapid labour	-0.007	0.631
Foetal distress (heart)	-0.006	0.654
Foetal distress (meconium)	0.009	0.510
Other	-0.002	0.879

Notes: Figures report the correlation between the variable to the left and the Exposure variable, as well as the P-value that the correlation is equal to zero. Sample comprises high educated mothers (NVQ level 3 or more), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of labour duration.

Source: Millennium Cohort Study.

TABLE B14 — BALANCE BY EXPOSURE (BINARY) TO WEEKEND - SUBSAMPLE OF HIGH EDUCATED MOTHERS

Variable	Exposure > 0	Exposure = 0	p-value diff	Std. Difference
Delivery				
Labour induced	0.301	0.263	0.005	0.060
Labour duration (hours)	9.648	9.453	0.506	0.014
Type Delivery:				
Normal	0.861	0.845	0.143	0.031
Forceps	0.063	0.063	0.929	-0.002
Vacuum	0.090	0.104	0.140	-0.032
Other	0.006	0.013	0.029	-0.050
Pain relief:				
None	0.078	0.087	0.279	-0.023
Gas and air	0.812	0.781	0.011	0.054
Pethidine	0.312	0.302	0.446	0.016
Epidural	0.256	0.245	0.386	0.018
General anaesthetic	0.002	0.002	0.810	-0.005
TENS	0.182	0.198	0.160	-0.030
Other	0.048	0.051	0.722	-0.008
Complication:				
None	0.729	0.714	0.264	0.024
Breech	0.002	0.003	0.633	-0.010
Other abnormal	0.027	0.034	0.181	-0.029
Very long labour	0.063	0.072	0.239	-0.025
Very rapid labour	0.028	0.026	0.650	0.010
Foetal distress (heart)	0.089	0.107	0.046	-0.043
Foetal distress (meconium)	0.059	0.052	0.328	0.020
Other	0.074	0.076	0.776	-0.006

Notes: Figures in columns titled "Exposure>0" and "Exposure=0" are sample means of the variable listed under the column titled "Variable". The p-value of the test of the difference between the two means is shown under the column titled "p-value diff". The standarized difference of the difference between the two means is shown under the colum titled "Std. Difference". Sample comprises high educated mothers (NVQ level 3 or more), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of labour duration.

Source: Millennium Cohort Study.

TABLE B15 — BALANCE OF VARIABLES FROM THE THE MATERNITY USERS SURVEY

Variable	Fri- Sun	Mon-Thurs	p-value diff
Had newborn exam before discharge	0.942	0.942	0.997
Newborn exam carried out by			
Doctor (vs. midwife, other or not checked)	0.707	0.707	0.973
Doctor or midwife (vs. other or not checked)	0.883	0.876	0.502
Room very clean	0.534	0.557	0.122
Toilets very clean	0.511	0.520	0.526
Mother given food choice at hospital	0.653	0.667	0.296
Mother says that she was given too little food	0.236	0.223	0.284
Mother rates food in hospital as good or very good	0.436	0.451	0.339
Mother stayed in hospital two days or more	0.371	0.389	0.196
Mother says that hospital stay was too short	0.115	0.121	0.542
Received enough information about post-natal recovery	0.853	0.872	0.053
During postnatal care…			
Always spoken to in a way that I could understand	0.728	0.726	0.870
Always treated with respect	0.695	0.711	0.228
Always treated with kindness	0.681	0.694	0.326
Always given the information I needed	0.644	0.639	0.738
In the six weeks after the birth of the baby, the mother received help and advice from health professionals about:			
Baby's crying	0.677	0.692	0.344
Baby's sleeping position	0.814	0.823	0.505
Feeding the baby	0.862	0.880	0.082
Baby's skin care	0.719	0.739	0.152
Baby's health and progress	0.905	0.914	0.264
Midwive visted the baby's home 5 or more times	0.385	0.395	0.482
Last time that baby was visited (by a midwife at home), he/she was 11 days old or older	0.509	0.544	0.015
Mother says that she would have liked to see the midwife more often	0.195	0.193	0.858
Mother received a postnatal check-up of her health	0.855	0.859	0.738
Mother was given information or offered advice about contraception from a health professional	0.909	0.910	0.928

Notes: Figures in columns titled "Fri-Sun" and "Mon-Thurs" are sample means of the variable listed under the column titled "Variable" (note exposure not possible to compute in this data source). The p-value of the test that the the two means are equal is shown under the column titled "p-value diff". Sample comprises low educated mothers, and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. All variables are dummy variables.

Source: Maternity Users Survey 2007.

TABLE B16 — BALANCE TABLE OF VARIABLES AVAILABLE IN THE MATERNITY USERS SURVEY - SAMPLE OF HIGH EDUCATED MOTHERS

Variable	Fri- Sun	Mon-Thurs	p-value diff	Standardized diff
Had newborn exam before discharge	0.945	0.944	0.739	0.004
Newborn exam carried out by				
Doctor vs. Midwife, other or not checked	0.737	0.745	0.312	-0.013
Doctor or Midwife vs. Other or not checked	0.898	0.903	0.361	-0.011
Received enough info about your recovery	0.829	0.838	0.191	-0.017
During postnatal care…				
Always spoken to in a way that I could understand	0.740	0.745	0.461	-0.009
Always treated with respect	0.675	0.674	0.910	0.001
Always Treated with kindness	0.639	0.640	0.883	-0.002
Always given the info needed	0.574	0.584	0.231	-0.015

Notes: Figures in columns titled "Fri-Sun" and "Mon-Thurs" are sample means of the variable listed under the column titled "Variable". The p-value of the test that the the two means are equal is shown under the column titled "p-value diff". The standardized difference between the Friday-Sunday means and the Monday-Thursday means is reported in the last column. Sample comprises high educated mothers, and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. All variables are dummy variables.

Source: Maternity Users Survey 2007.

TABLE B17 — BALANCE BY CUBIC POLYNOMIAL IN HOUR - MAIN SAMPLE BUT INCLUDING EMERGENCY CAESAREAN AND ICU

Variable	p-value	Variable	p-value
Antenatal		Back Pain/lumbago/sciatica	0.668
Received ante-natal care	0.929	Fits/convulsions/epilepsy	0.136
First ante-natal was before:		Diabetes	0.566
0-11 weeks	0.840	Cancer	0.481
12-13 weeks	0.636	Digestive or Bowel disorders	0.103
≥ 14 weeks	0.803	Diabetes during pregnancy	0.979
Don't know	0.576		
Attended ante-natal classes	0.441	*Mothers Socioeconomic Status*	
Received fertility treatment	0.854	Working during pregnancy	0.208
Planned parenthood	0.950	Live in house	0.369
		# rooms	0.341
Baby		Own outright	0.984
Female	0.812	Rent from Local Authority	0.614
Birth weight (kg)	0.135	Rent from Housing Association	0.295
Premature	0.246	Rent privately	0.740
Length of gestation (days)	0.354	Live with parents	0.549
Present at birth		Live rent free	0.117
Father	0.446	Heating	
Mother's friend	0.735	Open fire	0.875
Grandmother (in law)	0.434	Gas/electric fire	0.249
Someone else	0.435	Central	0.015
		No heating	0.506
Mothers Demographics		Damp or condensation at home	0.202
Age	0.735	Assets	
Had attained expected educ qual. at age 16	0.795	Telephone	0.042
Married	0.235	Dishwasher	0.471
Religion		Own computer	0.724
No religion	0.723	Tumble dryer	0.596
Catholic	0.286	Own/access to car	0.328
Protestant	0.519	Noisy Neighbours	
Anglican	0.566	Very common	0.350
Another type of Christian	0.845	Fairly common	0.445
Hindu	0.920	Not very common	0.492
Muslim	0.081	Not at all common	0.906
Other	0.900	Presence of rubbish and litter in the area	
Ethnicity		Very common	0.891
White	0.743	Fairly common	0.943
Mixed	0.072	Not very common	0.819
Indian	0.573	Not at all common	0.650
Pakistani/Bangladeshi	0.109	Vandalism and damage to property in the area	
Black	0.670	Very common	0.517
Other	0.459	Fairly common	0.808
Mother's Mother is still alive	0.831	Not very common	0.644
Lived away from home before 17	0.730	Not at all common	0.603
		Garden	
Mothers Health and Lifestyle		Own garden	0.324
Smoked during pregnancy (# avg. cig per day)	0.685	Shared garden	0.729
Drank during pregnancy	0.017	Social Assistance	
Longstanding illness	0.471	Child Tax Credit	0.393
Limiting longstanding illness	0.187	Working Families Tax Credit	0.709
If mother has ever had		Income Support	0.527
Migraine	0.874	Jobseekers Allowance	0.395
Hay fever or persistent runny rose	0.039	Housing Benefit	0.017
Bronchitis	0.716	Council Tax Benefit	0.021
Asthma	0.975	Invalid Care Allowance	0.487
Eczema	0.179		

Notes: Each cell reports the P-value of the joint hypothesis that the coefficients of a cubic polynomial in hour are jointly zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through planned caesarean sections. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms.

Source: Millennium Cohort Study.

TABLE B18 — BALANCE BY EXPOSURE TO WEEKEND (CONTINUOUS) - MAIN SAMPLE BUT INCLUDING EMERGENCY CAESAREAN AND ICU

Variable	Correlation with Exposure	p-value	Variable	Correlation with Exposure	p-value
Antenatal			Back Pain/lumbago/sciatica	-0.009	0.464
Received ante-natal care	-0.004	0.707	Fits/convulsions/epilepsy	-0.024	0.047
First ante-natal was before:			Diabetes	0.004	0.755
0-11 weeks	-0.001	0.957	Cancer	-0.013	0.268
12-13 weeks	-0.004	0.755	Digestive or Bowel disorders	-0.028	0.020
≥ 14 weeks	-0.001	0.962	Diabetes during pregnancy	-0.003	0.823
Don't know	0.008	0.491			
Attended ante-natal classes	-0.002	0.885	*Mothers Socioeconomic Status*		
Received fertility treatment	-0.011	0.344	Working during pregnancy	-0.010	0.384
Planned parenthood	-0.002	0.853	Live in house	0.008	0.499
			# rooms	-0.004	0.729
Baby			Own outright	-0.001	0.921
Female	-0.004	0.765	Rent from Local Authority	0.016	0.180
Birth weight (kg)	-0.006	0.631	Rent from Housing Association	0.002	0.865
Premature	0.020	0.089	Rent privately	-0.012	0.305
Length of gestation (days)	-0.015	0.199	Live with parents	0.005	0.671
Present at birth			Live rent free	0.009	0.450
Father	-0.007	0.545	Heating		
Mother's friend	-0.003	0.826	Open fire	0.002	0.863
Grandmother (in law)	0.016	0.173	Gas/electric fire	0.002	0.861
Someone else	0.011	0.336	Central	-0.013	0.278
			No heating	0.000	0.974
Mothers Demographics			Damp or condensation at home	-0.007	0.546
Age	-0.009	0.475	Assets		
Had attained expected educ qual. at age 16	0.001	0.945	Telephone	-0.009	0.440
Married	-0.022	0.067	Dishwasher	-0.010	0.391
Religion			Own computer	-0.009	0.448
No religion	0.008	0.520	Tumble dryer	-0.001	0.905
Catholic	0.008	0.477	Own/access to car	-0.011	0.365
Protestant	-0.005	0.690	Noisy Neighbours		
Anglican	-0.012	0.330	Very common	-0.013	0.279
Another type of Christian	-0.006	0.614	Fairly common	0.019	0.104
Hindu	-0.001	0.913	Not very common	-0.001	0.936
Muslim	-0.015	0.198	Not at all common	-0.004	0.707
Other	0.002	0.836	Presence of rubbish and litter in the area		
Ethnicity			Very common	0.001	0.931
White	0.001	0.921	Fairly common	-0.001	0.928
Mixed	0.023	0.050	Not very common	-0.001	0.912
Indian	-0.007	0.550	Not at all common	0.002	0.892
Pakistani/Bangladeshi	-0.006	0.610	Vandalism and damage to property in the area		
Black	-0.001	0.917	Very common	0.016	0.192
Other	0.000	0.971	Fairly common	0.007	0.572
Mother's Mother is still alive	-0.005	0.654	Not very common	-0.008	0.496
Lived away from home before 17	-0.008	0.524	Not at all common	-0.007	0.549
			Garden		
Mothers Health and Lifestyle			Own garden	-0.002	0.885
Smoked during pregnancy (# avg. cig per day)	-0.001	0.964	Shared garden	-0.009	0.460
Drank during pregnancy	-0.017	0.162	Social Assistance		
Longstanding illness	0.007	0.560	Child Tax Credit	-0.015	0.194
Limiting longstanding illness	0.021	0.080	Working Families Tax Credit	0.004	0.750
If mother has ever had			Income Support	0.008	0.521
Migraine	0.011	0.356	Jobseekers Allowance	-0.006	0.598
Hay fever or persistent runny rose	-0.032	0.007	Housing Benefit	0.028	0.018
Bronchitis	0.000	0.979	Council Tax Benefit	0.029	0.013
Asthma	0.000	0.973	Invalid Care Allowance	-0.004	0.707
Eczema	0.009	0.465			

Notes: Figures report the correlation between the variable to the left and the Exposure variable, as well as the P-value that the correlation is equal to zero. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through planned caesarean sections. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms.

Source: Millennium Cohort Study.

TABLE B19 — BALANCE BY EXPOSURE TO WEEKEND (BINARY) - MAIN SAMPLE BUT INCLUDING EMERGENCY CAESAREAN AND ICU

Variable	Exposure > 0	Exposure = 0	p-value diff	Std. Difference
Antenatal				
Received ante-natal care	0.951	0.954	0.591	-0.010
First ante-natal was before:				
0-11 weeks	0.398	0.408	0.427	-0.015
12-13 weeks	0.343	0.342	0.909	0.002
≥ 14 weeks	0.183	0.176	0.490	0.013
Don't know	0.027	0.028	0.795	-0.005
Attended ante-natal classes	0.262	0.265	0.822	-0.004
Received fertility treatment	0.017	0.018	0.769	-0.005
Planned parenthood	0.456	0.447	0.511	0.012
Baby				
Female	0.484	0.481	0.810	0.004
Birth weight (kg)	3.317	3.306	0.483	0.013
Premature	0.080	0.076	0.600	0.010
Length of gestation (days)	277.305	277.544	0.521	-0.012
Present at birth				
Father	0.787	0.787	0.987	0.000
Mother's friend	0.047	0.048	0.835	-0.004
Grandmother (in law)	0.248	0.246	0.890	0.003
Someone else	0.107	0.106	0.895	0.002
Mothers Demographics				
Age	26.585	26.636	0.747	-0.006
Had attained expected educ qual. at age 16	0.568	0.580	0.345	-0.017
Married	0.448	0.464	0.216	-0.023
Religion				
No religion	0.558	0.545	0.325	0.018
Catholic	0.047	0.043	0.467	0.013
Protestant	0.024	0.030	0.161	-0.026
Anglican	0.095	0.102	0.406	-0.015
Another type of Christian	0.035	0.044	0.064	-0.035
Hindu	0.010	0.009	0.819	0.004
Muslim	0.064	0.067	0.613	-0.009
Other	0.008	0.007	0.622	0.009
Ethnicity				
White	0.848	0.843	0.608	0.009
Mixed	0.012	0.010	0.485	0.013
Indian	0.021	0.021	0.949	0.001
Pakistani/Bangladeshi	0.078	0.082	0.635	-0.009
Black	0.029	0.030	0.680	-0.008
Other	0.011	0.013	0.545	-0.011
Mother's Mother is still alive	0.930	0.933	0.588	-0.010
Lived away from home before 17	0.198	0.209	0.313	-0.019
Mothers Health and Lifestyle				
Smoked during pregnancy (# avg. cig. per day)	3.555	3.639	0.591	-0.010
Drank during pregnancy	0.245	0.258	0.256	-0.021
Longstanding illness	0.212	0.202	0.356	0.017
Limiting longstanding illness	0.106	0.091	0.058	0.034
If mother has ever had				
Migraine	0.221	0.219	0.858	0.003
Hay fever or persistent runny rose	0.229	0.256	0.018	-0.044
Bronchitis	0.073	0.071	0.802	0.005
Asthma	0.175	0.178	0.781	-0.005
Eczema	0.181	0.180	0.941	0.001
Back Pain/lumbago/sciatica	0.212	0.224	0.232	-0.022
Fits/convulsions/epilepsy	0.026	0.031	0.186	-0.025
Diabetes	0.017	0.014	0.408	0.015
Cancer	0.009	0.011	0.427	-0.015
Digestive or Bowel disorders	0.078	0.084	0.372	-0.016
Diabetes during pregnancy	0.010	0.008	0.433	0.014
Mothers Socioeconomic Status				
Working during pregnancy	0.521	0.535	0.288	-0.019
Live in house	0.825	0.818	0.494	0.013
# rooms	5.005	5.030	0.475	-0.013
Own outright	0.026	0.024	0.534	0.011
Rent from Local Authority	0.288	0.274	0.224	0.022
Rent from Housing Association	0.098	0.108	0.220	-0.023
Rent privately	0.096	0.105	0.235	-0.022
Live with parents	0.057	0.059	0.720	-0.007
Live rent free	0.018	0.018	0.907	-0.002
Heating				
Open fire	0.035	0.035	0.957	0.001
Gas/electric fire	0.309	0.303	0.620	0.009
Central	0.885	0.897	0.138	-0.027
No heating	0.011	0.008	0.345	0.017
Damp or condensation at home	0.154	0.172	0.068	-0.034
Assets				
Telephone	0.943	0.940	0.604	0.010
Dishwasher	0.195	0.197	0.842	-0.004
Own computer	0.392	0.387	0.648	0.008
Tumble dryer	0.599	0.590	0.463	0.013
Own/access to car	0.733	0.732	0.936	0.001
Noisy Neighbours				
Very common	0.087	0.093	0.428	-0.015
Fairly common	0.123	0.118	0.554	0.011
Not very common	0.395	0.406	0.395	-0.016
Not at all common	0.395	0.383	0.352	0.017
Presence of rubbish and litter in the area				
Very common	0.150	0.149	0.874	0.003
Fairly common	0.223	0.225	0.887	-0.003
Not very common	0.358	0.377	0.135	-0.027
Not at all common	0.268	0.249	0.096	0.030
Vandalism and damage to property in the area				
Very common	0.114	0.105	0.287	0.019
Fairly common	0.155	0.162	0.437	-0.014
Not very common	0.398	0.404	0.666	-0.008
Not at all common	0.333	0.329	0.724	0.006
Garden				
Own garden	0.822	0.821	0.907	0.002
Shared garden	0.044	0.048	0.544	-0.011
Social Assistance				
Child Tax Credit	0.131	0.134	0.766	-0.005
Working Families Tax Credit	0.240	0.245	0.682	-0.008
Income Support	0.295	0.296	0.932	-0.002
Jobseekers Allowance	0.044	0.042	0.747	0.006
Housing Benefit	0.252	0.236	0.163	0.025
Council Tax Benefit	0.236	0.221	0.153	0.026
Invalid Care Allowance	0.017	0.014	0.293	0.019

Notes: Figures in columns titled "Exposure>0" and "Exposure=0" are sample means of the variable listed under the column titled "Variable". The p-value of the test of the difference between the two means is shown under the column titled "p-value diff". The standarized difference of the difference between the two means is shown under the colum titled "Std. Difference." Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through planned caesarean sections. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms.

Source: Millennium Cohort Study.

TABLE B20 — BALANCE BY CUBIC POLYNOMIAL IN HOUR - MAIN SAMPLE BUT INCLUDING EMERGENCY CAESAREAN AND ICU

Variable	p-value
Delivery	
Labour induced	0.000
Labour duration (hours)	0.145
Type Delivery:	
Normal	0.748
Forceps	0.405
Vacuum	0.920
Emergency	0.579
Other	
Pain relief:	0.332
None	0.146
Gas and air	0.281
Pethidine	0.297
Epidural	0.875
General anaesthetic	0.947
TENS	0.838
Other	
Complication:	0.891
None	0.689
Breech	0.022
Other abnormal	0.877
Very long labour	0.266
Very rapid labour	0.668
Foetal distress (heart)	0.429
Foetal distress (meconium)	0.272
Other	0.270

Notes: Each cell reports the P-value of the joint hypothesis that the coefficients of a cubic polynomial in hour are jointly zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through planned caesarean sections. All variables are dummy variables, with the exception of labour duration.

Source: Millennium Cohort Study.

TABLE B21 — BALANCE BY EXPOSURE TO WEEKEND (CONTINUOUS) - MAIN SAMPLE BUT INCLUDING EMERGENCY CAESAREAN AND ICU

Variable	Correlation with Exposure	p-value
Delivery		
Labour induced	0.043	0.000
Labour duration (hours)	0.006	0.639
Type Delivery:		
Normal	-0.003	0.788
Forceps	0.014	0.242
Vacuum	0.003	0.827
Emergency	-0.005	0.691
Other	0.015	0.196
Pain relief:		
None	-0.015	0.207
Gas and air	0.005	0.672
Pethidine	0.005	0.669
Epidural	0.008	0.513
General anaesthetic	-0.004	0.717
TENS	0.002	0.888
Other	0.007	0.558
Complication:		
None	0.001	0.935
Breech	0.000	0.997
Other abnormal	0.014	0.224
Very long labour	-0.001	0.918
Very rapid labour	-0.018	0.129
Foetal distress (heart)	0.006	0.603
Foetal distress (meconium)	-0.020	0.091
Other	0.006	0.643

Notes: Figures report the correlation between the variable to the left and the Exposure variable, as well as the P-value that the correlation is equal to zero. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through planned caesarean sections. All variables are dummy variables, with the exception of labour duration.

Source: Millennium Cohort Study.

TABLE B22 — BALANCE BY EXPOSURE TO WEEKEND (BINARY) - MAIN SAMPLE BUT INCLUDING EMERGENCY CAESAREAN AND ICU

Variable	Exposure > 0	Exposure = 0	p-value diff	Std. Difference
Delivery				
Labour induced	0.331	0.310	0.080	0.032
Labour duration (hours)	9.416	9.180	0.406	0.015
Type Delivery:				
Normal	0.789	0.787	0.851	0.003
Forceps	0.037	0.031	0.230	0.022
Vacuum	0.059	0.059	0.999	0.000
Emergency	0.121	0.124	0.736	-0.006
Other	0.007	0.006	0.557	0.011
Pain relief:				
None	0.091	0.092	0.817	-0.004
Gas and air	0.767	0.763	0.715	0.007
Pethidine	0.350	0.348	0.903	0.002
Epidural	0.273	0.264	0.429	0.014
General anaesthetic	0.024	0.029	0.212	-0.023
TENS	0.076	0.075	0.862	0.003
Other	0.042	0.037	0.287	0.019
Complication:				
None	0.690	0.694	0.746	-0.006
Breech	0.012	0.013	0.644	-0.009
Other abnormal	0.030	0.025	0.246	0.021
Very long labour	0.065	0.064	0.818	0.004
Very rapid labour	0.025	0.027	0.676	-0.008
Foetal distress (heart)	0.106	0.104	0.809	0.004
Foetal distress (meconium)	0.045	0.046	0.937	-0.001
Other	0.105	0.098	0.369	0.016

Notes: Figures in columns titled "Exposure>0" and "Exposure=0" are sample means of the variable listed under the column titled "Variable". The p-value of the test of the difference between the two means is shown under the column titled "p-value diff". The standarized difference of the difference between the two means is shown under the colum titled "Std. Difference." Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through planned caesarean sections. All variables are dummy variables, with the exception of labour duration.

Source: Millennium Cohort Study.

TABLE B23 — BALANCE BY CUBIC POLYNOMIAL IN HOUR - SAMPLE USED TO ESTIMATE THE FIRST COLUMN OF TABLE 5

Variable	p-value	Variable	p-value
Antenatal		Back Pain/lumbago/sciatica	0.448
Received ante-natal care	0.500	Fits/convulsions/epilepsy	0.109
First ante-natal was before:		Diabetes	0.714
0-11 weeks	0.476	Cancer	0.557
12-13 weeks	0.160	Digestive or Bowel disorders	0.046
≥ 14 weeks	0.910	Diabetes during pregnancy	0.967
Don't know	0.387		
Attended ante-natal classes	0.328	*Mothers Socioeconomic Status*	
Received fertility treatment	0.019	Working during pregnancy	0.168
Planned parenthood	0.786	Live in house	0.408
		# rooms	0.238
Baby		Own outright	0.680
Female	0.522	Rent from Local Authority	0.822
Birth weight (kg)	0.524	Rent from Housing Association	0.435
Premature	0.858	Rent privately	0.786
Length of gestation (days)	0.669	Live with parents	0.678
Present at birth		Live rent free	0.113
Father	0.307	Heating	
Mother's friend	0.433	Open fire	0.579
Grandmother (in law)	0.382	Gas/electric fire	0.330
Someone else	0.386	Central	0.028
		No heating	0.479
Mothers Demographics		Damp or condensation at home	0.054
Age	0.620	Assets	
Had attained expected educ qual. at age 16	0.672	Telephone	0.222
Married	0.803	Dishwasher	0.634
Religion		Own computer	0.895
No religion	0.627	Tumble dryer	0.424
Catholic	0.157	Own/access to car	0.326
Protestant	0.666	Noisy Neighbours	
Anglican	0.936	Very common	0.272
Another type of Christian	0.895	Fairly common	0.519
Hindu	0.869	Not very common	0.593
Muslim	0.057	Not at all common	0.610
Other	0.677	Presence of rubbish and litter in the area	
Ethnicity		Very common	0.629
White	0.498	Fairly common	0.756
Mixed	0.196	Not very common	0.718
Indian	0.359	Not at all common	0.800
Pakistani/Bangladeshi	0.063	Vandalism and damage to property in the area	
Black	0.864	Very common	0.771
Other	0.512	Fairly common	0.310
Mother's Mother is still alive	0.756	Not very common	0.758
Lived away from home before 17	0.779	Not at all common	0.809
		Garden	
Mothers Health and Lifestyle		Own garden	0.219
Smoked during pregnancy (# avg. cig per day)	0.459	Shared garden	0.975
Drank during pregnancy	0.284	Social Assistance	
Longstanding illness	0.731	Child Tax Credit	0.368
Limiting longstanding illness	0.188	Working Families Tax Credit	0.527
If mother has ever had		Income Support	0.870
Migraine	0.982	Jobseekers Allowance	0.089
Hay fever or persistent runny rose	0.089	Housing Benefit	0.064
Bronchitis	0.463	Council Tax Benefit	0.037
Asthma	0.933	Invalid Care Allowance	0.502
Eczema	0.142		

Notes: Each cell reports the P-value of the joint hypothesis that the coefficients of a cubic polynomial in hour are jointly zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms.

Source: Millennium Cohort Study.

TABLE B24 — BALANCE BY EXPOSURE TO WEEKEND (CONTINUOUS)- SAMPLE USED TO ESTIMATE THE FIRST COLUMN OF TABLE 5

Variable	Correlation with Exposure	p-value	Variable	Correlation with Exposure	p-value
Antenatal			Back Pain/lumbago/sciatica	-0.017	0.219
Received ante-natal care	-0.011	0.452	Fits/convulsions/epilepsy	-0.035	0.013
First ante-natal was before:			Diabetes	-0.002	0.880
0-11 weeks	-0.009	0.539	Cancer	-0.017	0.234
12-13 weeks	0.010	0.479	Digestive or Bowel disorders	-0.039	0.005
≥ 14 weeks	-0.006	0.660	Diabetes during pregnancy	-0.005	0.737
Don't know	-0.002	0.910			
Attended ante-natal classes	0.008	0.577	*Mothers Socioeconomic Status*		
Received fertility treatment	0.005	0.701	Working during pregnancy	-0.010	0.469
Planned parenthood	0.006	0.690	Live in house	0.002	0.896
			# rooms	-0.008	0.570
Baby			Own outright	0.006	0.674
Female	0.019	0.169	Rent from Local Authority	0.010	0.495
Birth weight (kg)	-0.005	0.701	Rent from Housing Association	0.010	0.475
Premature	0.007	0.626	Rent privately	-0.008	0.570
Length of gestation (days)	-0.010	0.492	Live with parents	0.008	0.574
Present at birth			Live rent free	-0.003	0.820
Father	0.004	0.797	Heating		
Mother's friend	-0.007	0.623	Open fire	0.008	0.584
Grandmother (in law)	0.020	0.147	Gas/electric fire	-0.006	0.685
Someone else	0.008	0.565	Central	-0.011	0.423
			No heating	0.007	0.606
Mothers Demographics			Damp or condensation at home	-0.026	0.062
Age	-0.009	0.525	Assets		
Had attained expected educ qual. at age 16	0.003	0.811	Telephone	-0.008	0.585
Married	-0.007	0.617	Dishwasher	-0.017	0.238
Religion			Own computer	-0.010	0.499
No religion	0.012	0.406	Tumble dryer	-0.012	0.401
Catholic	0.021	0.138	Own/access to car	0.000	0.997
Protestant	-0.013	0.347	Noisy Neighbours		
Anglican	0.003	0.828	Very common	-0.013	0.368
Another type of Christian	0.011	0.448	Fairly common	0.017	0.217
Hindu	0.010	0.466	Not very common	-0.007	0.620
Muslim	-0.007	0.645	Not at all common	0.003	0.843
Other	0.011	0.421	Presence of rubbish and litter in the area		
Ethnicity			Very common	-0.009	0.533
White	0.000	0.977	Fairly common	-0.007	0.606
Mixed	0.029	0.042	Not very common	0.016	0.258
Indian	-0.018	0.212	Not at all common	-0.003	0.805
Pakistani/Bangladeshi	-0.004	0.785	Vandalism and damage to property in the area		
Black	-0.006	0.656	Very common	0.010	0.473
Other	0.017	0.224	Fairly common	-0.017	0.230
Mother's Mother is still alive	-0.009	0.502	Not very common	0.002	0.881
Lived away from home before 17	-0.008	0.556	Not at all common	0.004	0.769
			Garden		
Mothers Health and Lifestyle			Own garden	-0.015	0.274
Smoked during pregnancy (# avg. cig per day)	-0.006	0.683	Shared garden	-0.006	0.696
Drank during pregnancy	-0.004	0.773	Social Assistance		
Longstanding illness	-0.001	0.956	Child Tax Credit	-0.008	0.563
Limiting longstanding illness	0.023	0.110	Working Families Tax Credit	0.002	0.889
If mother has ever had			Income Support	-0.001	0.971
Migraine	-0.002	0.889	Jobseekers Allowance	-0.009	0.520
Hay fever or persistent runny rose	-0.030	0.035	Housing Benefit	0.026	0.067
Bronchitis	0.013	0.348	Council Tax Benefit	0.028	0.050
Asthma	0.003	0.843	Invalid Care Allowance	-0.019	0.185
Eczema	0.013	0.346			

Notes: Figures report the correlation between the variable to the left and the Exposure variable, as well as the P-value that the correlation is equal to zero. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms.

Source: Millennium Cohort Study.

TABLE B25 — BALANCE BY EXPOSURE TO WEEKEND (BINARY) - SAMPLE USED TO ESTIMATE THE FIRST COLUMN OF TABLE 5

Variable	Exposure > 0	Exposure = 0	p-value diff	Std. Difference
Antenatal				
Received ante-natal care	0.954	0.957	0.593	-0.012
First ante-natal was before:				
0-11 weeks	0.399	0.411	0.457	-0.016
12-13 weeks	0.341	0.332	0.566	0.012
≥ 14 weeks	0.187	0.185	0.896	0.003
Don't know	0.027	0.029	0.693	-0.009
Attended ante-natal classes	0.249	0.246	0.826	0.005
Received fertility treatment	0.015	0.015	0.889	-0.003
Planned parenthood	0.460	0.449	0.481	0.015
Baby				
Female	0.507	0.486	0.170	0.030
Birth weight (kg)	3.363	3.352	0.486	0.015
Premature	0.043	0.045	0.746	-0.007
Length of gestation (days)	279.179	279.279	0.754	-0.007
Present at birth				
Father	0.799	0.798	0.982	0.000
Mother's friend	0.047	0.049	0.689	-0.009
Grandmother (in law)	0.249	0.242	0.608	0.011
Someone else	0.110	0.110	0.940	0.002
Mothers Demographics				
Age	26.568	26.691	0.513	-0.014
Had attained expected educ qual. at age 16	0.577	0.587	0.513	-0.014
Married	0.456	0.464	0.611	-0.011
Religion				
No religion	0.553	0.542	0.483	0.015
Catholic	0.045	0.038	0.244	0.025
Protestant	0.024	0.032	0.103	-0.036
Anglican	0.100	0.101	0.874	-0.003
Another type of Christian	0.038	0.040	0.657	-0.010
Hindu	0.010	0.008	0.397	0.018
Muslim	0.067	0.068	0.886	-0.003
Other	0.009	0.007	0.418	0.017
Ethnicity				
White	0.851	0.846	0.648	0.010
Mixed	0.012	0.009	0.285	0.023
Indian	0.019	0.024	0.262	-0.025
Pakistani/Bangladeshi	0.081	0.083	0.744	-0.007
Black	0.026	0.030	0.490	-0.015
Other	0.012	0.009	0.285	0.023
Mother's Mother is still alive	0.932	0.934	0.792	-0.006
Lived away from home before 17	0.202	0.208	0.668	-0.009
Mothers Health and Lifestyle				
Smoked during pregnancy (# avg. cig. per day)	3.559	3.621	0.734	-0.007
Drank during pregnancy	0.249	0.254	0.725	-0.008
Longstanding illness	0.207	0.205	0.862	0.004
Limiting longstanding illness	0.104	0.088	0.071	0.039
If mother has ever had				
Migraine	0.225	0.225	0.994	0.000
Hay fever or persistent runny rose	0.229	0.260	0.018	-0.052
Bronchitis	0.076	0.068	0.316	0.022
Asthma	0.174	0.178	0.745	-0.007
Eczema	0.182	0.181	0.913	0.002
Back Pain/lumbago/sciatica	0.208	0.232	0.062	-0.041
Fits/convulsions/epilepsy	0.022	0.032	0.072	-0.040
Diabetes	0.012	0.011	0.702	0.008
Cancer	0.010	0.011	0.716	-0.008
Digestive or Bowel disorders	0.076	0.088	0.143	-0.032
Diabetes during pregnancy	0.009	0.007	0.438	0.016
Mothers Socioeconomic Status				
Working during pregnancy	0.514	0.543	0.057	-0.041
Live in house	0.834	0.827	0.537	0.013
# rooms	5.033	5.078	0.284	-0.023
Own outright	0.028	0.025	0.492	0.015
Rent from Local Authority	0.284	0.273	0.404	0.018
Rent from Housing Association	0.101	0.104	0.740	-0.007
Rent privately	0.094	0.103	0.344	-0.021
Live with parents	0.058	0.056	0.814	0.005
Live rent free	0.016	0.019	0.460	-0.016
Heating				
Open fire	0.035	0.033	0.672	0.009
Gas/electric fire	0.306	0.297	0.528	0.014
Central	0.886	0.899	0.187	-0.028
No heating	0.011	0.007	0.076	0.036
Damp or condensation at home	0.157	0.183	0.022	-0.050
Assets				
Telephone	0.946	0.943	0.693	0.009
Dishwasher	0.200	0.206	0.594	-0.012
Own computer	0.399	0.396	0.795	0.006
Tumble dryer	0.595	0.608	0.401	-0.018
Own/access to car	0.744	0.735	0.502	0.015
Noisy Neighbours				
Very common	0.087	0.087	0.963	-0.001
Fairly common	0.122	0.115	0.502	0.014
Not very common	0.395	0.415	0.185	-0.029
Not at all common	0.397	0.383	0.356	0.020
Presence of rubbish and litter in the area				
Very common	0.151	0.152	0.929	-0.002
Fairly common	0.217	0.231	0.273	-0.024
Not very common	0.367	0.375	0.587	-0.012
Not at all common	0.265	0.242	0.081	0.038
Vandalism and damage to property in the area				
Very common	0.113	0.104	0.384	0.019
Fairly common	0.148	0.175	0.020	-0.051
Not very common	0.406	0.404	0.898	0.003
Not at all common	0.333	0.317	0.254	0.025
Garden				
Own garden	0.830	0.833	0.789	-0.006
Shared garden	0.042	0.045	0.605	-0.011
Social Assistance				
Child Tax Credit	0.130	0.135	0.666	-0.009
Working Families Tax Credit	0.249	0.256	0.618	-0.011
Income Support	0.288	0.290	0.870	-0.004
Jobseekers Allowance	0.044	0.043	0.793	0.006
Housing Benefit	0.255	0.237	0.155	0.031
Council Tax Benefit	0.240	0.219	0.104	0.035
Invalid Care Allowance	0.014	0.015	0.828	-0.005

Notes: Figures in columns titled "Exposure>0" and "Exposure=0" are sample means of the variable listed under the column titled "Variable". The p-value of the test of the difference between the two means is shown under the column titled "p-value diff". The standarized difference of the difference between the two means is shown under the colum titled "Std. Difference." Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and # rooms.

Source: Millennium Cohort Study.

TABLE B26 — BALANCE BY CUBIC POLYNOMIAL IN HOUR - SAMPLE USED TO ESTIMATE THE FIRST COLUMN OF TABLE 5

Variable	p-value
Delivery	
Labour induced	0.000
Labour duration (hours)	0.534
Type Delivery:	
Normal	0.086
Forceps	0.728
Vacuum	0.362
Other	0.481
Pain relief:	
None	0.292
Gas and air	0.281
Pethidine	0.327
Epidural	0.174
General anaesthetic	0.552
TENS	0.914
Other	0.811
Complication:	
None	0.978
Breech	0.906
Other abnormal	0.101
Very long labour	0.817
Very rapid labour	0.377
Foetal distress (heart)	0.670
Foetal distress (meconium)	0.302
Other	0.815

Notes: Each cell reports the P-value of the joint hypothesis that the coefficients of a cubic polynomial in hour are jointly zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of labour duration.

Source: Millennium Cohort Study.

TABLE B27 —BALANCE BY EXPOSURE TO WEEKEND - SAMPLE USED TO ESTIMATE THE FIRST COLUMN OF TABLE 5

Variable	Correlation with Exposure	p-value
Delivery		
Labour induced	0.052	0.000
Labour duration (hours)	0.004	0.797
Type Delivery:		
Normal	-0.006	0.696
Forceps	0.009	0.531
Vacuum	-0.002	0.881
Other	0.025	0.081
Pain relief:		
None	-0.019	0.168
Gas and air	0.015	0.288
Pethidine	0.007	0.608
Epidural	0.010	0.471
General anaesthetic	0.014	0.336
TENS	0.004	0.787
Other	0.012	0.385
Complication:		
None	0.002	0.870
Breech	0.002	0.900
Other abnormal	0.007	0.607
Very long labour	0.006	0.651
Very rapid labour	-0.015	0.297
Foetal distress (heart)	-0.008	0.583
Foetal distress (meconium)	-0.022	0.115
Other	0.005	**0.749**

Notes: Figures report the correlation between the variable to the left and the Exposure variable, as well as the P-value that the correlation is equal to zero. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of labour duration.

Source: Millennium Cohort Study.

TABLE B28 — BALANCE BY EXPOSURE TO WEEKEND (BINARY) - SAMPLE USED TO ESTIMATE THE FIRST COLUMN OF TABLE 5

Variable	Exposure > 0	Exposure = 0	p-value diff	Std. Difference
Delivery				
Labour induced	0.314	0.287	0.056	0.041
Labour duration (hours)	8.817	8.707	0.729	0.007
Type Delivery:				
Normal	0.904	0.897	0.448	0.017
Forceps	0.037	0.036	0.815	0.005
Vacuum	0.062	0.066	0.547	-0.013
Other	0.009	0.007	0.476	0.015
Pain relief:				
None	0.100	0.105	0.573	-0.012
Gas and air	0.801	0.791	0.444	0.017
Pethidine	0.360	0.369	0.559	-0.013
Epidural	0.202	0.198	0.712	0.008
General anaesthetic	0.003	0.001	0.233	0.024
TENS	0.076	0.078	0.827	-0.005
Other	0.035	0.031	0.426	0.017
Complication:				
None	0.758	0.754	0.764	0.007
Breech	0.003	0.005	0.463	-0.017
Other abnormal	0.019	0.020	0.952	-0.001
Very long labour	0.048	0.043	0.372	0.019
Very rapid labour	0.026	0.029	0.571	-0.012
Foetal distress (heart)	0.073	0.080	0.406	-0.018
Foetal distress (meconium)	0.037	0.043	0.341	-0.021
Other	0.080	0.078	0.728	0.008

Notes: Figures in columns titled "Exposure>0" and "Exposure=0" are sample means of the variable listed under the column titled "Variable". The p-value of the test of the difference between the two means is shown under the column titled "p-value diff". The standarized difference of the difference between the two means is shown under the colum titled "Std. Difference." Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. All variables are dummy variables, with the exception of labour duration.

Source: Millennium Cohort Study.

Appendix C: Monte Carlo Experiment

Given our sample and First-Stage estimates, what estimates (or bias) should we expect if the true effect of breastfeeding on children's development is zero? And analogously, what should we expect if the true effect is positive? To answer these questions, as well as investigate the finite sample properties of NTSLS, which is still relatively new in empirical practice, we perform a Monte Carlo simulation. We use our model estimates as well as our sample to define the data generating process so that the results are relevant for our subsequent empirical analysis.

C1. Design of the Monte Carlo Experiment

We design the Monte Carlo experiment such that the Monte Carlo samples closely resemble the analysis sample. With this objective, we specify the Data Generating Process (DGP) of the Monte Carlo simulation using the sample and parameter values (both of the First Stage and of the outcome equation) that we obtain when we estimate the model with the cognitive index as the outcome variable (Table 5 column 1 if we use *Exposure* as exclusion restriction, and Table 5 column 4 if we use the cubic polynomial in *Hour*). Moreover, we choose the value of the correlation between the error term of the breastfeeding and the outcome equation so that the average OLS estimate across the Monte Carlo samples equals the OLS estimate obtained using the analysis sample (Table 5). In what follows, we describe in detail the Monte Carlo exercise using *Exposure,* but we also report the results of when we use the cubic polynomial in *Hour*.

The Monte Carlo design keeps the sample of (N=5,015) observations, $\mathbf{X_i}$ and $Exposure_i$ variables fixed. We carry out seven different Monte Carlo simulations, one for each different value of α_1: $0, 0.05, 0.10, 0.15, 0.25, 0.35, 0.46$ (this latter one corresponds to the one estimated using actual data and reported in column 1 of Table 5). The steps below require that we specify a value for ρ, the correlation between the unobservables of the breastfeeding equation and of the cognitive development equation, $(\varepsilon_i, \vartheta_i)$. We define a grid of possible values for ρ, and carry out the steps below for each value of the grid (for ease of notation, we omit the sub index of ρ, α, and the Monte Carlo replica sub index) and then choose the final results to report

according to the criteria specified in Step 8. The steps of the Monte Carlo design are as follow:

Step 1a: Estimate a Probit First Stage model (see equation 3) using actual data: *Exposure*$_i$, $\mathbf{X_i}$ and B_i (Breastfeeding). The estimates $[\hat{\beta}_0, \hat{\beta}_1, \widehat{\boldsymbol{\beta}_2}]$ are saved, to be used in the steps below. Note that this step is independent of the chosen values of α_1 and ρ.

Step 2a: Use NTSLS to estimate the parameters of the outcome equation (equation 2) on actual data: *Exposure*$_i$, $\mathbf{X_i}$, B_i (breastfeeding), $\mathbf{h_j}$ (hospital fixed effect), Y_{ij} (cognitive index). The estimates $[\hat{\alpha}_0, \hat{\alpha}_1, \widehat{\boldsymbol{\alpha}_2}, \widehat{h_j}, \hat{\sigma}_\varepsilon^2]$ are saved, to be used in the steps below. The estimate of $[\hat{\alpha}_1]$ is the one reported in Table 5 col. 1 (Table 5 col. 4 if using *Hour*). Note that this step is also independent of the chosen values of α_1 and ρ.

Step 3a: Obtain $\{\tilde{\varepsilon}_i, \tilde{\vartheta}_i\}_{i=1}^{N}$ draws of the bivariate normal distribution with variances (σ_ε^2,1) and correlation coefficient ρ.

Step 4a: Using the parameter values of the First Stage Probit model from step 1a, $[\hat{\beta}_0, \hat{\beta}_1, \widehat{\boldsymbol{\beta}_2}]$, we obtain simulated values for breastfeeding, $\widetilde{B_i}$, as $\widetilde{B_i}$ =1 $[\hat{\beta}_0 + \hat{\beta}_1 Exposure_i + \widehat{\boldsymbol{\beta}_2}\mathbf{X_i} + \tilde{\vartheta}_i > 0]$.

Step 5a: Using the parameter values of the outcome equation obtained in step 2a, $[\hat{\alpha}_0, \widehat{\boldsymbol{\alpha}_2}, \widehat{\mathbf{h_j}}, \hat{\sigma}_\varepsilon^2]$, we obtain simulated values for $\widetilde{Y_{ij}}$ as $\widetilde{Y_{ij}} = \hat{\alpha}_0 + \alpha_1 \widetilde{B_i} + \widehat{\boldsymbol{\alpha}_2}\mathbf{X_i} + \widehat{\mathbf{h_j}} + \tilde{\varepsilon}_i$, where $\widetilde{B_i}$ comes from Step 4a and α_1 depends on the specific Monte Carlo simulation (α_1: 0, 0.05, 0.10, 0.15, 0.25, 0.35, 0.46).

Step 6a: Using the 5015 observations of *Exposure*$_i$, X_i, and associated simulated values of $\widetilde{B_i}$ (from step 4a), and $\widetilde{Y_{ij}}$ (from step 5a), the second stage IV regression (equation 2) is estimated using NTSLS and TSLS to obtain $\bar{\bar{\alpha}}_1^{NTSLS}$ and $\bar{\bar{\alpha}}_1^{TSLS}$. The values of $\bar{\bar{\alpha}}_1^{NTSLS}$, $\bar{\bar{\alpha}}_1^{TSLS}$ are saved, as well as their estimated standard errors. In this step, we also compute the OLS estimator of equation (2) and save $\bar{\bar{\alpha}}_1^{OLS}$.

Step 7a: Repeat steps 3a-6a 1,000 times, keeping *Exposure*$_i$, $\mathbf{X_i}$, $\mathbf{h_j}$, the values of α_1, ρ, and the parameters from steps 1 and 2 fixed.

Step 8a: Report the results for which ρ is such that the average of $\bar{\bar{\alpha}}_1^{OLS}$ across the 1,000 simulations is equal to the actual OLS estimate of α_1 $(= 0.057)$. [1]

[1] We report the results for which ρ is such that the average of $\bar{\bar{\alpha}}_1^{OLS}$ across the 1,000 simulations equals the actual OLS estimate so that the Monte Carlo samples resemble closely our study sample. Because the DGP for breastfeeding follows a non-linear process, there is no closed form solution to obtain such a value of ρ, and hence we implement a grid search.

C2. Monte Carlo Experiment Results

Table C1 compares the descriptive statistics of the cognitive index and breastfeeding in the actual data with those of the simulated data (for the case of case of $\alpha_1 = 0.46$) to check that the simulated data replicates the empirical patterns of the actual data.

TABLE C1 — MONTE CARLO: COMPARISON OF ACTUAL AND SIMULATED DATA

	Actual Data	Simulated Data- Exposure to weekend	Simulated Data - Polynomial in hours
Cognitive Index			
Average	0.0050	0.0048	0.0075
SD	0.5559	0.5553	0.5544
Breastfed			
Average	0.2389	0.2388	0.2388

Notes. The first column of the Table reports descriptive statistics for the variables cognitive index and breastfeeding for at least 90 days, for the sample used to estimate the first column of Table 5. The second and third columns report the same descriptive statistics across 1000 Monte Carlo simulations in which the parameters of the Data Generating Process, both first and second stage, including the sample size and control variables correspond to the ones obtained using the cognitive index as dependent variable (Table 5, cognitive index, NTSLS), using exposure to weekend or the polynomial in hours as exclusion restrictions. The first and second stage equations of the Data Generating Process assume bivariate normality with correlation coefficient chosen so that the average OLS estimate of breastfeeding on the cognitive index across the 1000 Monte Carlo simulations match the OLS estimate reported in the third row and first column of Table 5.

For each value of α_1, Table C2 reports the average, median, and standard deviation (SD) of $\bar{\bar{\alpha}}_1^{NTSLS}$ and $\bar{\bar{\alpha}}_1^{TSLS}$ across the 1,000 Monte Carlo samples, as well as the average across the 1,000 estimated standard errors of $\bar{\bar{\alpha}}_1^{NTSLS}$ and $\bar{\bar{\alpha}}_1^{TSLS}$. When the true effect of breastfeeding on cognitive development is set to zero ($\alpha_1 = 0$), both the NTSLS and TSLS averages and medians are centered at zero. The difference between the two methods is in the dispersion of the parameter estimates. The SD of $\hat{\alpha}_1$ is three times larger when we use TSLS than NTSLS. Hence, given the parameter estimates of our First Stage (which we use to simulate the data), we should expect $\hat{\alpha}_1$ to be close to zero if there is truly no effect of breastfeeding (but dispersion will be much higher when using TSLS than NTSLS). Similar results (i.e. averages/medians being very close to the true effect but dispersion being much smaller with NTSLS than TSLS) are found for values of α_1 up to 0.15.

TABLE C2 — MONTE CARLO: COMPARISON NTSLS VS. TSLS. EXCLUSION RESTRICTION EXPOSURE TO WEEKEND

	True α1 = 0		True α1 = 0.05		True α1 = 0.10		True α1 = 0.15	
	NTSLS	TSLS	NTSLS	TSLS	NTSLS	TSLS	NTSLS	TSLS
Average of $\hat{\alpha}_1$	0.017	-0.027	0.051	0.060	0.090	0.151	0.127	0.179
Median of $\hat{\alpha}_1$	0.021	-0.012	0.051	0.062	0.091	0.101	0.121	0.173
SD of $\hat{\alpha}_1$	0.146	0.677	0.145	0.680	0.146	0.667	0.153	0.679
Average of Standard Error of $\hat{\alpha}_1$	0.149	0.813	0.149	0.764	0.149	0.795	0.149	0.730
MSE	0.221	0.699	0.192	0.625	0.161	0.543	0.137	0.541

	True α1 = 0.25		True α1 = 0.35		True α1 = 0.46	
	NTSLS	TSLS	NTSLS	TSLS	NTSLS	TSLS
Average of $\hat{\alpha}_1$	0.197	0.270	0.268	0.403	0.354	0.538
Median of $\hat{\alpha}_1$	0.190	0.230	0.267	0.355	0.353	0.469
SD of $\hat{\alpha}_1$	0.151	0.666	0.148	0.670	0.146	0.674
Average of Standard Error of $\hat{\alpha}_1$	0.148	0.861	0.148	0.721	0.147	0.732
MSE	0.094	0.481	0.060	0.452	0.033	0.459

Notes. The first row reports the average across 1000 Monte Carlo simulations of the estimate of breastfeeding for at least 90 days in equation (2). The column heading indicates the effect of breastfeeding as assumed in the Monte Carlo simulations (the value of 0.46 correspond to the one estimated using actual data in Table 5). The rest of the parameters of the Data Generating Process, both first and second stage, including the sample size and control variables correspond to the ones obtained using the cognitive index as dependent variable (Table 5, cognitive index, NTSLS). The error terms of the first and second stage are assumed to be bivariate normal with correlation coefficient chosen so that the average OLS estimate of breastfeeding across 1000 simulations is equal to the one estimated in the actual data (0.057, see Table 5). The estimation method, NTSLS (Non-Linear Two Stage Least Squares) or TSLS (Two Stage Least Squares), is noted in the column heading. The second (third) row corresponds to the median (standard deviation) of the estimate of breastfeeding across the 1000 Monte Carlo simulations. The fourth row reports the average across the 1000 simulations of the estimated standard error of the breastfeeding coefficient. The fifth row reports the Mean Square Error of the breastfeeding coefficient.

The columns for values of α_1 ranging from 0.25 to 0.46 show that both TSLS and NTSLS estimators are biased towards zero, with the size of the bias larger for NTSLS (which means that NTSLS estimates are particularly conservative).[2] The larger α_1 is, the larger the bias (towards zero) is. This is because the larger α_1, the further away α_1 is from its OLS estimate of 0.057, and hence the larger the endogeneity (correlation between the error terms of the equations) is. For a given strength of the First Stage, the larger the endogeneity is, the worse are the properties of the instrumental variables estimators (Shea 1997; Hall, Rudebusch, and Wilcox 1996). Note however that the far smaller dispersion of NTSLS with respect to TSLS is independent of the true value of α_1. Similar results are obtained using the third order polynomial in *Hour* instead of *Exposure* as exclusion restriction (see Table C3).

[2] Newey (1990a) also reports a larger bias with NTSLS than with TSLS even when he uses the prediction obtained with the true Probit model instead of the estimated one, as us.

TABLE C3 — MONTE CARLO: COMPARISON NTSLS VS. TSLS. EXCLUSION RESTRICTION POLYNOMIAL IN HOUR

	True α1 = 0		True α1 = 0.05		True α1 = 0.10		True α1 = 0.15	
	NTSLS	TSLS	NTSLS	TSLS	NTSLS	TSLS	NTSLS	TSLS
Average of $\hat{\alpha}_1$	0.018	0.003	0.052	0.061	0.091	0.098	0.126	0.153
Median of $\hat{\alpha}_1$	0.021	0.005	0.051	0.061	0.093	0.090	0.124	0.144
SD of $\hat{\alpha}_1$	0.138	0.412	0.139	0.417	0.141	0.398	0.144	0.420
Average of Standard Error of $\hat{\alpha}_1$	0.142	0.423	0.142	0.419	0.141	0.409	0.142	0.419
MSE	0.208	0.372	0.179	0.327	0.151	0.283	0.127	0.266

	True α1 = 0.25		True α1 = 0.35		True α1 = 0.46	
	NTSLS	TSLS	NTSLS	TSLS	NTSLS	TSLS
Average of $\hat{\alpha}_1$	0.198	0.232	0.267	0.322	0.352	0.425
Median of $\hat{\alpha}_1$	0.197	0.213	0.267	0.309	0.347	0.390
SD of $\hat{\alpha}_1$	0.145	0.401	0.140	0.392	0.137	0.442
Average of Standard Error of $\hat{\alpha}_1$	0.141	0.414	0.141	0.408	0.140	0.423
MSE	0.086	0.209	0.054	0.170	0.029	0.196

Notes: The first row reports the average across 1000 Monte Carlo simulations of the estimate of breastfeeding for at least 90 days in equation (2). The column heading indicates the effect of breastfeeding as assumed in the Monte Carlo simulations. The rest of the parameters of the Data Generating Process, both first and second stage, including the sample size and control variables correspond to the ones obtained using the cognitive index as dependent variable (Table 5, cognitive index, NTSLS). The error terms of the first and second stage are assumed to be bivariate normal with correlation coefficient chosen so that the average OLS estimate of breastfeeding across 1000 simulations is equal to the one estimated in the actual data (0.057, see Table 5). The estimation method, NTSLS (Non-Linear Two Stage Least Squares) or TSLS (Two Stage Least Squares), is noted in the column heading. The second (third) row corresponds to the median (standard deviation) of the estimate of breastfeeding across the 1000 Monte Carlo simulations. The fourth row reports the average across the 1000 simulations of the estimated standard error of the breastfeeding coefficient. The fifth row reports the Mean Square Error of the breastfeeding coefficient.

Source: Millennium Cohort Study.

It is known that weak instruments might result in the estimated standard errors being too small. However, the Monte Carlo results indicate that this is not a problem in our case. Indeed, the standard errors are correctly estimated (independently of the true value of α_1, the SD across the $\hat{\alpha}_1$ estimates matches the average estimated standard error of $\hat{\alpha}_1$ across the 1,000 Monte Carlo samples with either NTSLS or TSLS). For the case of *Exposure*, TSLS produces a few very large outlier values of $\bar{\bar{\alpha}}_1^{TSLS}$ which we eliminate (around 20) when computing Table C2. This explains why the standard errors of $\bar{\bar{\alpha}}_1^{TSLS}$ are slightly overestimated. Note that this is not a problem when we use NTSLS, nor when we use the cubic polynomial in *Hour*.

In summary, using our sample and parameter estimates (including our First Stage estimates) to simulate data, we find that (1) both NTSLS and TSLS are consistent if the true effect of breastfeeding is relatively small (including zero), (2) both NTSLS and TSLS are biased towards zero if the true effect is large, (3) the standard errors are correctly estimated. This means that our estimates are conservative and that, if

anything, our estimates will be lower bounds. We also find that NTSLS is far more precise than TSLS.

C3. Departures from Normality

It is natural to ask how the NTLS will perform *vis-á-vis* TSLS if the true DGP for the breastfeeding binary variable is not normal, yet a Probit model is used, as we currently do. To study this, we conduct a new Monte Carlo experiment, which we specify below (for simplicity we keep α_1 to be 0.46). In the design below, the degree of endogeneity of Breastfeeding will be measured by the parameter π, which we define below precisely below. As we did with ρ in the previous design, we compute the simulation below for a grid of values of π and then choose the final results to report according to the criteria specified in Step 8b below. The steps of the Monte Carlo experiment are as follow:

Step 1b: Choose one of the following distributions for the error term of (3): a *t*-distribution with three degrees of freedom (which generates a symmetric distribution with fat tails),[3] a mixture of two normal with means -2 and +2 and standard deviation of 1 (which provides a symmetric but bimodal distribution), and a generalized logistic distribution, where the location is 0, the scale parameter is 1, and shape parameter is 0.4 (which generates a distribution skewed to the left). Under the chosen non-normal distribution, estimate (through Maximum Likelihood) the discrete choice model (3) using the same sample and variables that we use for the analysis.

Step 2b: Simply recover the value of the estimates of $[\hat{\alpha}_0, \hat{\alpha}_1, \widehat{\boldsymbol{\alpha}_2}, \widehat{\mathbf{h}_j}, \hat{\sigma}_\varepsilon^2]$, which were obtained in Step 2a of section C1 of this Appendix. Note that $\hat{\alpha}_1$ will be equal to 0.46.

Step 3b: Draw $\{\tilde{\vartheta}_i\}_{i=1}^{N}$ from the non-Normal distribution selected in Step 1(b), and draw $\{\tilde{v}_i\}_{i=1}^{N}$ from a $N(0,\sigma_v^2)$. Compute $\tilde{\varepsilon}_i = \pi\tilde{\vartheta}_i + \tilde{v}_i$, using values of σ_v^2 such that the variance of $\tilde{\varepsilon}_i$ corresponds to $\widehat{\sigma}_\varepsilon^2$.

[3] When choosing these distributions, we follow Westerlund and Hjertstrand (2014), who study the properties of a semi-parametric binary choice estimator Westerlund and Hjertstrand (2014) use a t-distribution with 1 instead of 3 degrees of freedom because the one with 1 degree of freedom generates many outliers when estimating the second stage, probably because the variance the t distribution with 1 or 2 degrees is not defined. This is probably not an issue for Westerlund and Hjertstrand (2014) because they only estimate the binary choice model, and do not have a linear second stage as we have.

Step 4b: Using the parameter values of the discrete choice model estimated in Step 1b and the corresponding draws, $\{\tilde{\vartheta}_i\}_{i=1}^{N}$, obtain simulated values for breastfeeding, $\widetilde{B_\iota}$ using (3). Note that $\{\tilde{\vartheta}_i\}_{i=1}^{N}$ do not follow a Normal distribution.

Step 5b: Using the parameter values of the outcome equation obtained in Step 2b, $[\hat{\alpha}_0, \widehat{\boldsymbol{\alpha}_2}, \widehat{\boldsymbol{h_J}}]$, and the $\{\tilde{\varepsilon}_i\}_{i=1}^{N}$ draws, obtain simulated values for $\widetilde{Y_{\iota J}}$ as $\widetilde{Y_{\iota J}} = \hat{\alpha}_0 + \alpha_1\widetilde{B_\iota} + \widehat{\boldsymbol{\alpha}_2}\mathbf{X_i} + \widehat{\mathbf{h}_\mathbf{J}} + \tilde{\varepsilon}_i$, where $\widetilde{B_\iota}$ comes from Step 4 (b) and α_1 equals 0.46.

Step 6b: Using the 5015 observations of *Exposure*$_i$, $\mathbf{X_i}$, and associated simulated values of $\widetilde{B_\iota}$ (from Step 4b), and $\widetilde{Y_{\iota J}}$ (from Step 5b), the second stage IV regression (equation 2) is estimated using NTSLS (using the Probit prediction as instrument) and TSLS to obtain $\bar{\bar{\alpha}}_1^{NTSLS}$ and $\bar{\bar{\alpha}}_1^{TSLS}$. The values of $\bar{\bar{\alpha}}_1^{NTSLS}$, $\bar{\bar{\alpha}}_1^{TSLS}$ are saved, as well as their estimated standard errors. In this step, we also compute the OLS estimator of equation (2) and save $\bar{\bar{\alpha}}_1^{OLS}$.

Step 7b: Repeat steps 3-6 1,000 times, keeping *Exposure*$_i$, $\mathbf{X_i}$, $\mathbf{h_j}$, the values of α_1, ρ, and the parameters from steps 1b (including the distributional assumptions) and 2b fixed.

Step 8b: Report the results for which π is such that the average of $\bar{\bar{\alpha}}_1^{OLS}$ across the 1,000 simulations is equal to the actual OLS estimate of α_1 $(= 0.057)$.

Table C4 reports the results of the Monte Carlo experiment when the true error term of the discrete choice model of Breastfeeding does not follow a Normal distribution, but still we use NTSLS (with the prediction of breastfeeding from a Probit model as instrument). The first row shows that the NTSLS estimate of α_1 is still biased towards zero (as in Tables C2 and C3). The third and fourth row shows that the estimated standard errors are also unbiased for NTSLS. Also, independently of the true distribution of the error term of the discrete choice model, the NTSLS estimates of α_1 using a Probit model are much less dispersed than when TSLS (linear prediction) is used. So neither our interpretation that the estimates obtained using NTSLS are conservative, nor our main conclusions on the advantages of the NTSLS *vis-á-vis* TSLS, depend on the true distribution of the error term being Normal.

TABLE C4 — SIMULATIONS: COMPARISON NTSLS VS. TSLS. EXCLUSION RESTRICTION EXPOSURE TO WEEKEND

	Error Distribution					
	t-student		generalized logistic		mix of normals	
True α1 = 0.46	NTSLS	TSLS	NTSLS	TSLS	NTSLS	TSLS
Average of $\hat{\alpha}_1$	0.402	0.524	0.346	0.517	0.242	0.527
Median of $\hat{\alpha}_1$	0.398	0.481	0.346	0.422	0.230	0.464
SD of $\hat{\alpha}_1$	0.119	0.674	0.148	0.661	0.226	0.712
Average of Standard Error of $\hat{\alpha}_1$	0.125	0.799	0.151	0.709	0.228	0.839
MSE	0.018	0.457	0.036	0.440	0.101	0.510

Notes. The first row reports the average across 1000 Monte Carlo simulations of the estimate of breastfeeding for at least 90 days in equation (2). The column heading indicates the distribution of the error term of the breastfeeding discrete choice model. The estimation method, NTSLS (Non-Linear Two Stage Least Squares) or TSLS (Two Stage Least Squares), is noted in the column heading. NTSLS always uses a Probit model for Breastfeeding, independently of the true distribution of the discrete choice model, which is indicated in the column heading. The second (third) row corresponds to the median (standard deviation) of the estimate of breastfeeding across the 1000 Monte Carlo simulations. The fourth row reports the average across the 1000 simulations of the estimated standard error of the breastfeeding coefficient. The fifth row reports the Mean Square Error of the breastfeeding coefficient.

Appendix D: Results by Age

In this appendix, we report results on the effects of breastfeeding on children's development separately by age and measures. This not only provides insight into the magnitude of the effects, but also helps to see where the effects are most concentrated (and whether the index is masking effects at specific ages/for specific subtests). Note that in the tables in this appendix, effects are presented in terms of coefficient estimates, and the mean and standard deviation of the outcome variables are shown in the table for scaling purposes. As before, the tables report the NTSLS estimates along with the TSLS and OLS estimates.

Table D1 extends the results contained in Table 6 (main text), with the results for age 7. Because attrition is substantially higher at age 7, we also report results correcting for attrition using Inverse Propensity Weighing (IPW) in columns 9-11. At age 7, we do not find effects of breastfeeding in children cognitive development, although it must be said that our estimates are even more imprecise than for age 3 and 5 (which can be seen by comparing the standard error of the estimates to the standard deviation reported at the bottom of the table).

TABLE D1 — EFFECT OF BREASTFEEDING ON COGNITIVE OUTCOMES AT AGES 3, 5 AND 7 YEARS

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
	3 years		5 years			7 years			7 years (IPW)		
	Expressive Language	School Readiness	Expressive Language	Pictorial Reasoning	Visuo-Spatial	Numerical	Reading	Visuo-Spatial	Numerical	Reading	Visuo-Spatial
NTSLS	9.883	8.259	8.583	3.212	4.892	0.942	-11.844	8.548	1.103	-4.122	11.904
	(5.037)	(3.707)	(5.164)	(4.162)	(6.753)	(1.120)	(11.970)	(6.163)	(1.188)	(12.478)	(6.715)
TSLS	21.979	7.336	22.183	14.443	23.256	-0.228	-11.958	-9.145	-0.064	5.799	-6.568
	(21.872)	(12.345)	(19.729)	(15.538)	(25.323)	(2.827)	(28.565)	(17.007)	(2.262)	(22.810)	(13.602)
OLS	2.062	1.038	1.579	1.100	1.119	0.358	2.375	1.671	0.292	1.467	1.624
	(0.623)	(0.456)	(0.544)	(0.442)	(0.727)	(0.114)	(1.218)	(0.681)	(0.120)	(1.257)	(0.724)
F statistic	4.696	6.539	5.386	5.570	5.498	6.395	7.538	6.457	6.395	7.538	6.457
P-value	0.030	0.011	0.020	0.018	0.019	0.012	0.006	0.011	0.012	0.006	0.011
Mean	70.38	22.19	104.10	80.24	85.43	9.12	101.10	114.00	9.12	101.10	114.00
SD	17.74	12.56	15.64	11.75	19.70	2.87	30.96	16.68	2.87	30.96	16.68
Observations	4,212	4,004	4,349	4,355	4,333	3,888	3,840	3,872	3,888	3,840	3,872

Notes. Each cell reports coefficient of breastfeeding for at least 90 days from separate regressions in which the dependent variable is listed at the top of the column and the estimation method is listed in the left hand column (NTSLS denotes non-linear two-stage least squares; TSLS denotes two-stage least squares; OLS denotes ordinary least squares). Control variables are those listed in Tables 2 and B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bank holiday (137 covariates in total), as well as hospital fixed effects. The exclusion restriction from the second-stage regressions is exposure to weekend. F statistic and P-value correspond to the null hypothesis that the coefficient(s) on the excluded variable(s) is zero, as estimated from an OLS regression where the dependent variable is breastfeeding for at least 90 days, and controls are as noted already. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Standard errors in parentheses.

Source: Millennium Cohort Study.

We next turn to the effects on children's non-cognitive skills, as measured by the widely used Strengths and Difficulties Questionnaire. Estimates are shown in Table D2. The effects on this domain are considerably weaker than the effects on cognition: at no age are the effects statically distinguishable from zero at conventional levels.

TABLE D2 — EFFECT OF BREASTFEEDING ON NON-COGNITIVE OUTCOMES AT AGES 3, 5 AND 7 YEARS

	3 years	5 years	7 years
	Strengths and Difficulties	Strengths and Difficulties	Strengths and Difficulties
NTSLS	2.059	-0.701	0.613
	(1.674)	(1.350)	(1.445)
TSLS	-3.103	2.343	0.727
	(5.599)	(3.641)	(3.614)
OLS	0.754	0.375	0.566
	(0.175)	(0.136)	(0.164)
F statistic	5.748	6.598	8.277
P-value	0.017	0.010	0.004
Mean	24.98	23.70	24.48
SD	4.880	3.602	4.122
Observations	4,127	4,213	3,818

Notes: Each cell reports coefficient of breastfeeding for at least 90 days from separate regressions in which the dependent variable is listed at the top of the column and the estimation method is listed in the left hand column (NTSLS denotes non-linear two-stage least squares; TSLS denotes two-stage least squares; OLS denotes ordinary least squares). Control variables are those listed in Tables 2 and B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bank holiday (137 covariates in total), as well as hospital fixed effects. The exclusion restriction from the second-stage regressions is exposure to weekend. F statistic and P-value correspond to the null hypothesis that the coefficient(s) on the excluded variable(s) is jointly zero, as estimated from an OLS regression where the dependent variable is breastfeeding for at least 90 days, and controls are as noted already. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Standard errors in parentheses.

Source: Millennium Cohort Study.

The final dimension of child development we consider is health, which we additionally observe at wave 1, when the child is approximately 9 months old. Hence, Tables D3 - D6 report results for 9 months, 3, 5 and 7 years of age. Our results are in line with those of the randomized trial conducted by Kramer et al. (2001), which found only weak effects on health, as well as Baker and Milligan (2008).[1] It is also worth stressing that we are unlikely to pick up any health effect of breastfeeding that is present only during the period when the mother

[1] Clearly, this result is not relevant for developing countries where hygienic conditions are very different and children who are not breastfed are at much higher risk of infection.

breastfeeds the child (and that ceases once breastfeeding discontinues).[2] This is because 2 out of 3 mothers who breastfed for at least 3 months are not breastfeeding by 9 months, the time when health outcomes are observed. Another limitation of the health outcomes is that, except for obesity, they are self-reported by the mother, rather than assessed directly by a trained interviewers (as is the case for the cognitive outcomes).

TABLE D3 — EFFECT OF BREASTFEEDING ON PHYSICAL OUTCOMES AT 9 MONTHS OF AGE

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	Obesity	Chest infections	Ear infections	Wheezing or asthma	Skin problems	Persistent or severe vomiting	Persistent or severe diarrhea
NTSLS	-0.033	0.066	0.04	-0.098	0.011	0.133	-0.007
	(0.086)	(0.161)	(0.102)	(0.098)	(0.143)	(0.097)	(0.096)
TSLS	0.437	-0.223	0.277	0.368	0.012	0.131	-0.095
	(0.295)	(0.453)	(0.312)	(0.297)	(0.379)	(0.262)	(0.267)
OLS	-0.024	-0.009	0.004	-0.013	0.015	-0.001	-0.022
	(0.008)	(0.015)	(0.010)	(0.008)	(0.013)	(0.009)	(0.009)
F statistic	8.024	7.725	7.725	7.725	7.725	7.725	7.725
P-value	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Mean	0.066	0.290	0.088	0.075	0.171	0.070	0.078
SD	0.248	0.454	0.283	0.263	0.377	0.254	0.268
Observations	5,578	5,808	5,808	5,808	5,808	5,808	5,808

Notes. Each cell reports coefficient of breastfeeding for at least 90 days from separate regressions in which the dependent variable is listed at the top of the column and the estimation method is listed in the left hand column (NTSLS denotes non-linear two-stage least squares; TSLS denotes two-stage least squares; OLS denotes ordinary least squares). Control variables are those listed in Tables 2 and B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bank holiday (137 covariates in total), as well as hospital fixed effects. The exclusion restriction from the second-stage regressions is exposure to weekend. F statistic and P-value correspond to the null hypothesis that the coefficient(s) on the excluded variable(s) is zero, as estimated from an OLS regression where the dependent variable is breastfeeding for at least 90 days, and controls are as noted already. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Standard errors in parentheses.

Source: Millennium Cohort Study.

[2] It is plausible that breastfeeding improves health while the child is being breastfed, due to the transmission of the mother's antibodies to the child, protecting him/her from infections, but that this benefit ceases once breastfeeding is discontinued.

TABLE D4 — PHYSICAL OUTCOMES AT 3 YEARS OF AGE

	[1]	[2]	[3]	[4]	[5]	[6]
	Obesity	Long standing health condition	Recurring ear infections	Asthma (ever)	Eczema/ Hay fever (ever)	Wheezing/ whistling in chest (ever)
NTSLS	-0.146	-0.143	0.009	-0.164	-0.250	-0.061
	(0.083)	(0.133)	(0.097)	(0.135)	(0.173)	(0.164)
TSLS	0.067	-0.755	-0.035	-0.618	-0.038	0.397
	(0.292)	(0.596)	(0.305)	(0.503)	(0.580)	(0.614)
OLS	0.000	-0.01	0.008	-0.023	-0.021	-0.023
	(0.010)	(0.014)	(0.010)	(0.012)	(0.018)	(0.017)
F statistic	5.061	5.162	5.245	5.666	5.186	5.162
P-value	0.025	0.023	0.022	0.017	0.023	0.023
Mean	0.060	0.158	0.064	0.139	0.367	0.323
SD	0.237	0.365	0.245	0.346	0.482	0.468
Observations	4,209	4,487	4,484	4,412	4,440	4,487

Notes. Each cell reports coefficient of breastfeeding for at least 90 days from separate regressions in which the dependent variable is listed at the top of the column and the estimation method is listed in the left hand column (NTSLS denotes non-linear two-stage least squares; TSLS denotes two-stage least squares; OLS denotes ordinary least squares). Control variables are those listed in Tables 2 and B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bank holiday (137 covariates in total), as well as hospital fixed effects. The exclusion restriction from the second-stage regressions is exposure to weekend. F statistic and P-value correspond to the null hypothesis that the coefficient(s) on the excluded variable(s) is zero, as estimated from an OLS regression where the dependent variable is breastfeeding for at least 90 days, and controls are as noted already. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Standard errors in parentheses.

Source: Millennium Cohort Study.

TABLE D5 — PHYSICAL OUTCOMES AT 5 YEARS OF AGE

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	Obesity	Excellent health	Long standing health condition	Asthma (ever)	Eczema (ever)	Hay fever (ever)	Wheezing/ whistling in chest (ever)
NTSLS	-0.255	-0.031	0.171	0.015	-0.112	0.095	0.193
	(0.098)	(0.188)	(0.154)	(0.141)	(0.178)	(0.123)	(0.175)
TSLS	-0.072	-0.139	-0.162	0.380	-0.102	0.586	0.200
	(0.289)	(0.538)	(0.434)	(0.436)	(0.510)	(0.434)	(0.499)
OLS	-0.018	0.023	0.027	-0.003	0.01	0.009	-0.019
	(0.009)	(0.019)	(0.016)	(0.014)	(0.018)	(0.013)	(0.017)
F statistic	5.712	6.532	6.508	6.582	6.719	6.060	6.603
P-value	0.017	0.011	0.011	0.010	0.010	0.014	0.010
Mean	0.062	0.478	0.194	0.169	0.329	0.107	0.301
SD	0.240	0.500	0.395	0.375	0.470	0.309	0.459
Observations	4,343	4,398	4,397	4,380	4,394	4,381	4,396

Notes. Each cell reports coefficient of breastfeeding for at least 90 days from separate regressions in which the dependent variable is listed at the top of the column and the estimation method is listed in the left hand column (NTSLS denotes non-linear two-stage least squares; TSLS denotes two-stage least squares; OLS denotes ordinary least squares). Control variables are those listed in Tables 2 and B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bank holiday (137 covariates in total), as well as hospital fixed effects. The exclusion restriction from the second-stage regressions is exposure to weekend. F statistic and P-value correspond to the null hypothesis that the coefficient(s) on the excluded variable(s) is zero, as estimated from an OLS regression where the dependent variable is breastfeeding for at least 90 days, and controls are as noted already. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Standard errors in parentheses.

Source: Millennium Cohort Study.

TABLE D6 —PHYSICAL OUTCOMES AT 7 YEARS OF AGE

	[1]	[2]	[3]	[4]	[5]	[6]
	Obesity	Long standing health condition	Asthma (ever)	Eczema (ever)	Hay fever (ever)	Wheezing/ whistling in chest (ever)
NTSLS	-0.187	-0.099	-0.008	0.054	0.214	0.029
	(0.117)	(0.149)	(0.141)	(0.174)	(0.142)	(0.164)
TSLS	-0.123	-0.244	0.378	0.393	0.353	0.397
	(0.301)	(0.378)	(0.389)	(0.489)	(0.371)	(0.450)
OLS	-0.011	0.011	-0.008	0.011	0.003	-0.006
	(0.012)	(0.016)	(0.015)	(0.020)	(0.015)	(0.018)
F statistic	6.769	7.616	7.705	7.296	7.008	7.587
P-value	0.009	0.006	0.006	0.007	0.008	0.006
Mean	0.100	0.186	0.176	0.335	0.155	0.260
SD	0.300	0.389	0.381	0.472	0.362	0.439
Observations	3,895	3,944	3,937	3,941	3,920	3,945

Notes: Each cell reports coefficient of breastfeeding for at least 90 days from separate regressions in which the dependent variable is listed at the top of the column and the estimation method is listed in the left hand column (NTSLS denotes non-linear two-stage least squares; TSLS denotes two-stage least squares; OLS denotes ordinary least squares). Control variables are those listed in Tables 2 and B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bank holiday (137 covariates in total), as well as hospital fixed effects. The exclusion restriction from the second-stage regressions is exposure to weekend. F statistic and P-value correspond to the null hypothesis that the coefficient(s) on the excluded variable(s) is zero, as estimated from an OLS regression where the dependent variable is breastfeeding for at least 90 days, and controls are as noted already. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Standard errors in parentheses.

Source: Millennium Cohort Study.

Appendix E: Attrition

Attrition is known to be non-negligible across cohort studies worldwide. In the US Early Childhood Longitudinal Study-Birth Cohort attrition is around 21% by the time children are aged 3, while attrition is 40% in the Canadian National Longitudinal Survey of Children and Youth by the time children are 4 or 5 years old. In the MCS, a substantial effort is made to reduce attrition and children are followed up in subsequent waves even if they could not be reached in one of them. As a consequence, attrition is a non-absorbing state, and a child can return to the sample after exiting (Figure E1 shows the sample flow between waves 1 and 4).

For the purpose of the paper, the most important issue is whether attrition renders our identification strategy invalid. For this, it is necessary to establish whether the characteristics of the attriters differ by timing of birth. *A priori*, it is unlikely to be a problem - attrition is much more likely be related to parent's mobility and availability than to the day the child was born. In Table E1 we show that the difference in the attrition rate of children exposed to the weekend versus those who are not is practically zero (ranging between -1.1% and +0.06%). In Tables E2, we show that attrition is also uncorrelated with the exclusion restrictions that we use in the analysis: *Exposure* and the cubic polynomial in *Hour*. In Tables E3-E8 we extend the balance exercise that we reported in Appendix B but for each MCS wave separately. We conclude that attrition is unrelated to our exclusion restrictions and our identification strategy remains valid for the sample available in each wave.

A different issue from the one discussed in the previous paragraph is whether the effects that we have estimated are also valid for the sample that has attrited. This would only be so if attrition was random, which is unlikely to be the case. In Table E9 we compare the characteristics of attriters (=1 if attrit in at least one wave; 0 if never attrit) with the characteristics of non-attriters. Those who attrit are less likely to attend antenatal classes, and more likely to have received their first prenatal check-up relatively later on in their pregnancy. They are also a little worse off (less likely to have attained the expected qualification at age 16, less likely to own certain assets, etc).

TABLE E1 — DIFFERENCE IN ATTRITION RATES BY WEEKEND EXPOSURE (BINARY)

	Attrition = overall cognitive and non-cognitive indices missing	Attrition = cognitive and non-cognitive indices missing in wave 2	Attrition = cognitive and non-cognitive indices missing in wave 3	Attrition = cognitive and non-cognitive indices missing in wave 4
Panel A: Without Control Variables				
Exposure>0	0.004	-0.011	-0.002	-0.009
	(0.009)	(0.012)	(0.012)	(0.013)
Attrition rate	0.128	0.233	0.242	0.319
Panel B: With Control Variables				
Exposure>0	0.006	-0.005	-0.002	-0.007
	(0.010)	(0.012)	(0.012)	(0.013)

Notes: Panel A: the top cell reports the coefficient from separate OLS regressions of a dependent variable that takes value 1 if the child has attrited (as defined in the heading of each column) and 0 otherwise on a dummy variable that takes value 1 if the mother and baby are expososed to the weekend during their stay at the Hospital. The bottom cell of Panel A reports the average attrition (as defined in the heading of each column) rate. Panel B reports the same coefficients as the top cell of Panel A but including in the OLS regressions the following control variables: those listed in Tables 2 and B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bank holiday (137 covariates in total). Sample comprises low educated mothers (NVQ level 2 or less, or those whose NVQ level is unknown but left school before 17), but excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. Standard errors in parentheses.

Source: Millennium Cohort Study.

TABLE E2 — RELATION BETWEEN ATTRITION AND THE EXCLUSION RESTRICTIONS

	Attrition = overall cognitive and non-cognitive indices missing	Attrition = cognitive and non-cognitive indices missing in wave 2	Attrition = cognitive and non-cognitive indices missing in wave 3	Attrition = cognitive and non-cognitive indices missing in wave 4
Panel A: Without Control Variables				
(a) Exposure to Weekend	0.0163	0.0061	-0.0010	-0.0059
	(0.011)	(0.014)	(0.014)	(0.015)
(b) Polynomial in Hour				
hour	0.0004	0.0021	0.0001	0.0006
	(0.001)	(0.001)	(0.001)	(0.001)
(hour^2)/100	-0.0004	-0.0029	-0.0003	-0.0009
	(0.001)	(0.002)	(0.002)	(0.002)
(hour^3)/10000	0.0002	0.0012	0.0001	0.0003
	(0.000)	(0.001)	(0.001)	(0.001)
P-value Joint	0.285	0.102	0.992	0.960
Panel B: With Control Variables				
(a) Exposure to Weekend	0.0171	0.0092	-0.0045	-0.0080
	(0.011)	(0.014)	(0.014)	(0.015)
(b) Polynomial in Hour				
hour	0.0002	0.0015	-0.0001	0.0005
	(0.001)	(0.001)	(0.001)	(0.001)
(hour^2)/100	-0.0000	-0.0021	-0.0000	-0.0006
	(0.001)	(0.002)	(0.002)	(0.002)
(hour^3)/10000	0.0000	0.0009	0.0001	0.0002
	(0.000)	(0.001)	(0.001)	(0.001)
P-value Joint	0.360	0.192	0.955	0.902

Notes: Panel A: the top cell reports the coefficient from separate OLS regressions of a dependent variable that takes value 1 if the child has attrited (as defined in the heading of each column) and 0 otherwise on (a) exposure to weekend or (b) cubic polynomial in hour, where hour^2 is divided by 100 and hour^3 is divided by 10.000. Panel B reports the same coefficients as the top cell of Panel A but including in the OLS regressions the following controls: those listed in Tables 2 and B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bank holiday (137 covariates in total). Sample comprises low educated mothers (NVQ level 2 or less, or those whose NVQ level is unknown but left school before 17), but excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care. Standard errors in parentheses.

Source: Millennium Cohort Study.

TABLE E3 — BALANCE BY EXPOSURE TO WEEKEND. SUBSAMPLE NOT ATTRITED IN MCS2

Variable	P-value	Correlation w/ Exposure	Std. Difference (Exposure)	Variable	P-value	Correlation w/ Exposure	Std. Difference (Exposure)	Variable	P-value	Correlation w/ Exposure	Std. Difference (Exposure)
Antenatal				Someone else	0.810	0.004	-0.009	Own outright	0.835	-0.003	0.017
Received ante-natal care	0.637	-0.007	-0.013	*Mothers Demographics*				Rent from Local Authority	0.699	0.006	0.017
First ante-natal was before:				Mother's age	0.527	-0.009	-0.016	Rent from Housing Association	0.341	0.014	0.002
0-11 weeks	0.632	-0.007	-0.012	Expected qualification at age 16	0.272	0.016	0.008	Rent privately	0.898	0.002	-0.002
12-13 weeks	0.525	0.010	0.011	Married	0.615	-0.008	-0.013	Live with parents	0.371	0.013	0.013
≥ 14 weeks	0.820	-0.003	0.007	Religion				Live rent free	0.360	-0.014	-0.039
Don't know	0.639	-0.007	-0.030	No religion	0.248	0.017	0.022	Heating			
Attended ante-natal classes	0.315	0.015	0.015	Catholic	0.466	0.011	0.016	Open fire	0.470	0.011	0.011
Received fertility treatment	0.811	0.004	-0.008	Protestant	0.185	-0.020	-0.044	Gas/electric fire	0.489	-0.010	0.009
Planned parenthood	0.924	-0.001	0.014	Anglican	0.873	0.002	0.001	Central	0.550	-0.009	-0.029
Delivery				Another type of Christian	0.573	0.008	-0.014	No heating	0.818	0.003	0.034
Labour induced	0.000	0.052	0.050	Hindu	0.572	0.008	0.005	Damp or condensation at home	0.084	-0.026	-0.042
Labour duration (hours)	0.926	0.001	0.005	Muslim	0.500	-0.010	-0.009	Assets			
Type Delivery:				Other	0.121	0.023	0.031	Telephone	0.731	-0.005	-0.002
Normal	0.846	-0.003	0.017	Ethnicity				Dishwasher	0.315	-0.015	-0.012
Forceps	0.504	0.010	0.002	White	0.892	0.002	0.018	Own computer	0.611	-0.008	0.004
Vacuum	0.969	-0.001	-0.008	Mixed	0.160	0.021	0.015	Tumble dryer	0.420	-0.012	-0.016
Other	0.258	0.017	0.008	Indian	0.525	-0.010	-0.016	Own/access to car	0.766	0.004	0.021
Pain relief:				Pakistani/Bangladeshi	0.524	-0.010	-0.020	Noisy Neighbours			
None	0.120	-0.023	-0.014	Black	0.761	-0.005	-0.016	Very common	0.846	-0.003	0.002
Gas and air	0.304	0.015	0.018	Other	0.244	0.017	0.027	Fairly common	0.801	0.004	0.009
Pethidine	0.890	0.002	-0.023	Mother's Mother is still alive	0.823	-0.003	-0.001	Not very common	0.503	-0.010	-0.040
Epidural	0.377	0.013	0.013	Lived away from home before 17	0.460	-0.011	-0.012	Not at all common	0.538	0.009	0.033
General anaesthetic	0.341	0.014	0.025	*Mothers Health and Lifestyle*				Rubbish and litter in the area			
TENS	0.532	0.009	0.009	Smoked during pregnancy (avg. cigarettes per day)	0.481	-0.011	-0.017	Very common	0.513	-0.010	0.001
Other	0.404	0.013	0.014	Drank during pregnancy	0.853	0.003	0.003	Fairly common	0.651	-0.007	-0.022
Complication:				Longstanding illness	0.916	0.002	0.000	Not very common	0.416	0.012	-0.026
None	0.597	0.008	0.010	Limiting longstanding illness	0.126	0.023	0.039	Not at all common	0.953	0.001	0.049
Breech	0.583	-0.008	-0.026	If mother has ever had				Vandalism and damage to property			
Other abnormal	0.877	0.002	0.001	Migraine	0.714	-0.005	-0.004	Very common	0.551	0.009	0.022
Very long labour	0.741	0.005	0.015	Hay fever or persistent runny rose	0.078	-0.026	-0.056	Fairly common	0.229	-0.018	-0.049
Very rapid labour	0.298	-0.016	-0.013	Bronchitis	0.535	0.009	0.012	Not very common	0.854	0.003	-0.001
Foetal distress (heart)	0.333	-0.015	-0.027	Asthma	0.729	0.005	-0.019	Not at all common	0.724	0.005	0.025
Foetal distress (meconium)	0.310	-0.015	-0.013	Eczema	0.446	0.011	-0.002	Garden			
Other	0.898	0.002	0.007	Back Pain/lumbago/sciatica	0.294	-0.016	-0.044	Own garden	0.191	-0.020	-0.017
Baby				Fits/convulsions/epilepsy	0.017	-0.036	-0.048	Shared garden	0.587	0.008	0.013
Female	0.082	0.026	0.039	Diabetes	0.974	0.000	0.010	Social Assistance			
Birth weight (kg)	0.589	-0.008	0.012	Cancer	0.334	-0.014	0.001	Child Tax Credit	0.544	-0.009	-0.008
Premature	0.358	0.014	0.003	Digestive or Bowel disorders	0.122	-0.023	-0.014	Working Families Tax Credit	0.605	0.008	-0.010
Length of gestation (days)	0.280	-0.016	-0.015	Diabetes during pregnancy (only)	0.713	-0.006	0.014	Income Support	0.915	-0.002	0.004
Present at birth				*Mothers Socioeconomic Status*				Jobseekers Allowance	0.997	0.000	0.009
Father	0.472	0.011	0.018	Working during pregnancy	0.409	-0.012	-0.049	Housing Benefit	0.056	0.029	0.041
Mother's friend	0.700	-0.006	-0.005	Live in house	0.782	-0.004	0.003	Council Tax Benefit	0.065	0.028	0.044
Grandmother (in law)	0.071	0.027	0.029	# rooms	0.885	-0.002	-0.021	Invalid Care Allowance	0.170	-0.021	-0.004

Notes: The first column reports the P-value of the hypothesis that the coefficient of exposure to weekend is zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". The second column reports the correlation coefficients of each variable with exposure to weekend (continuous). The third column reports the standardised difference between the groups with exposure to weekend versus no exposure. Sample comprises low educated mothers (NVQ level 2 or less, or those whose NVQ level is unknown but left school before 17), but excludes children born through caesarean sections (either emergency or planned), children placed in intensive care and attriters from MCS2. Attrition variable is defined as equal to one if all the developmental variables have missing values. All variables are dummy variables except for labour duration, birth weight, length of gestation, mother's age and number of rooms.

Source: Millennium Cohort Study.

TABLE E4 — BALANCE BY EXPOSURE TO WEEKEND. SUBSAMPLE NOT ATTRITED IN MCS3

Variable	p-value	Correlation w/ Exposure	Std. Difference (Exposure)	Variable	p-value	Correlation w/ Exposure	Std. Difference (Exposure)	Variable	p-value	Correlation w/ Exposure	Std. Difference (Exposure)
Antenatal				Someone else	0.339	0.014	0.002	Own outright	0.434	0.012	0.006
Received ante-natal care	0.577	-0.008	-0.013	*Mothers Demographics*				Rent from Local Authority	0.554	0.009	0.026
First ante-natal was before:				Mother's age	0.223	-0.018	-0.027	Rent from Housing Association	0.450	0.011	-0.008
0-11 weeks	0.503	-0.010	-0.025	Expected qualification at age 16	0.813	0.004	-0.014	Rent privately	0.286	-0.016	-0.038
12-13 weeks	0.639	0.007	0.012	Married	0.458	-0.011	-0.015	Live with parents	0.298	0.016	0.010
≥ 14 weeks	0.806	-0.004	0.010	Religion				Live rent free	0.825	0.003	-0.007
Don't know	0.575	0.008	0.002	No religion	0.540	0.009	0.016	Heating			
Attended ante-natal classes	0.635	0.007	-0.003	Catholic	0.164	0.021	0.035	Open fire	0.550	0.009	0.011
Received fertility treatment	0.955	0.001	-0.003	Protestant	0.394	-0.013	-0.038	Gas/electric fire	0.920	-0.002	0.016
Planned parenthood	0.850	-0.003	0.014	Anglican	0.809	-0.004	-0.010	Central	0.206	-0.019	-0.051
Delivery				Another type of Christian	0.468	0.011	-0.007	No heating	0.802	0.004	0.039
Labour induced	0.000	0.063	0.060	Hindu	0.344	0.014	0.019	Damp or condensation at home	0.074	-0.027	-0.046
Labour duration (hours)	0.778	-0.004	0.000	Muslim	0.674	-0.006	-0.008	Assets			
Type Delivery:				Other	0.392	0.013	0.013	Telephone	0.664	-0.007	0.004
Normal	0.795	-0.004	0.019	Ethnicity				Dishwasher	0.273	-0.017	-0.008
Forceps	0.512	0.010	0.004	White	0.815	-0.004	0.007	Own computer	0.712	-0.006	0.015
Vacuum	0.666	-0.007	-0.018	Mixed	0.022	0.034	0.022	Tumble dryer	0.550	-0.009	-0.006
Other	0.092	0.025	0.016	Indian	0.263	-0.017	-0.027	Own/access to car	0.935	0.001	0.026
Pain relief:				Pakistani/Bangladeshi	0.980	0.000	0.001	Noisy Neighbours			
None	0.223	-0.018	-0.011	Black	0.472	-0.011	-0.017	Very common	0.782	-0.004	0.019
Gas and air	0.202	0.019	0.019	Other	0.167	0.021	0.019	Fairly common	0.197	0.019	0.015
Pethidine	0.440	0.012	-0.007	Mother's Mother is still alive	0.438	-0.012	-0.003	Not very common	0.658	-0.007	-0.034
Epidural	0.470	0.011	0.004	Lived away from home before 17	0.291	-0.016	-0.009	Not at all common	0.800	-0.004	0.014
General anaesthetic	0.777	0.004	0.013	*Mothers Health and Lifestyle*				Rubbish and litter in the area			
TENS	0.782	0.004	-0.002	Smoked during pregnancy (avg. cigarettes per day)	0.427	-0.012	-0.017	Very common	0.961	-0.001	0.012
Other	0.712	0.006	0.012	Drank during pregnancy	0.541	-0.009	-0.014	Fairly common	0.656	-0.007	-0.029
Complication:				Longstanding illness	0.644	-0.007	0.005	Not very common	0.398	0.013	-0.012
None	0.911	0.002	0.005	Limiting longstanding illness	0.330	0.015	0.031	Not at all common	0.636	-0.007	0.032
Breech	0.802	0.004	-0.014	If mother has ever had				Vandalism and damage to property			
Other abnormal	0.486	0.011	0.001	Migraine	0.616	-0.008	-0.006	Very common	0.360	0.014	0.029
Very long labour	0.840	0.003	0.012	Hay fever or persistent runny rose	0.049	-0.030	-0.049	Fairly common	0.260	-0.017	-0.048
Very rapid labour	0.166	-0.021	-0.020	Bronchitis	0.360	0.014	0.023	Not very common	0.935	-0.001	0.000
Foetal distress (heart)	0.523	-0.010	-0.011	Asthma	0.741	0.005	-0.004	Not at all common	0.734	0.005	0.017
Foetal distress (meconium)	0.153	-0.022	-0.023	Eczema	0.845	0.003	-0.003	Garden			
Other	0.731	0.005	0.002	Back Pain/lumbago/sciatica	0.461	-0.011	-0.030	Own garden	0.262	-0.017	-0.016
Baby				Fits/convulsions/epilepsy	0.024	-0.034	-0.034	Shared garden	0.553	-0.009	-0.006
Female	0.100	0.025	0.033	Diabetes	0.654	0.007	0.016	Social Assistance			
Birth weight (kg)	0.483	-0.011	0.008	Cancer	0.124	-0.023	-0.010	Child Tax Credit	0.419	-0.012	-0.012
Premature	0.465	0.011	0.009	Digestive or Bowel disorders	0.002	-0.046	-0.036	Working Families Tax Credit	0.596	0.008	0.004
Length of gestation (days)	0.418	-0.012	-0.023	Diabetes during pregnancy (only)	0.843	0.003	0.023	Income Support	0.956	0.001	-0.004
Present at birth				*Mothers Socioeconomic Status*				Jobseekers Allowance	0.671	-0.006	0.005
Father	0.763	0.005	0.018	Working during pregnancy	0.382	-0.013	-0.053	Housing Benefit	0.064	0.028	0.033
Mother's friend	0.867	0.003	0.006	Live in house	0.798	-0.004	0.003	Council Tax Benefit	0.066	0.028	0.039
Grandmother (in law)	0.103	0.025	0.001	# rooms	0.340	-0.014	-0.029	Invalid Care Allowance	0.148	-0.022	-0.004

Notes: The first column reports the P-value of the hypothesis that the coefficient of exposure to weekend is zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". The second column reports the correlation coefficients of each variable with exposure to weekend (continuous). The third column reports the standardised difference between the groups with exposure to weekend versus no exposure. Sample comprises low educated mothers (NVQ level 2 or less, or those whose NVQ level is unknown but left school before 17), but excludes children born through caesarean sections (either emergency or planned), children placed in intensive care and attriters from MCS3. Attrition variable is defined as equal to one if all the developmental variables have missing values. All variables are dummy variables except for labour duration, birth weight, length of gestation, mother's age and number of rooms.

Source: Millennium Cohort Study.

TABLE E5 — BALANCE BY EXPOSURE TO WEEKEND. SUBSAMPLE NOT ATTRITED IN MCS4

Variable	P-value	Correlation w/ Exposure	Std. Difference (Exposure)	Variable	P-value	Correlation w/ Exposure	Std. Difference (Exposure)	Variable	P-value	Correlation w/ Exposure	Std. Difference (Exposure)
Antenatal				Someone else	0.321	0.016	0.004	Own outright	0.420	0.013	0.007
Received ante-natal care	0.774	-0.005	-0.019	*Mothers Demographics*				Rent from Local Authority	0.649	0.007	0.017
First ante-natal was before:				Mother's age	0.150	-0.023	-0.042	Rent from Housing Association	0.738	0.005	-0.016
0-11 weeks	0.844	-0.003	-0.017	Expected qualification at age 16	0.791	0.004	-0.009	Rent privately	0.601	-0.008	-0.005
12-13 weeks	0.806	0.004	0.010	Married	0.574	-0.009	-0.021	Live with parents	0.319	0.016	0.004
≥ 14 weeks	0.998	0.000	0.005	Religion				Live rent free	0.663	-0.007	-0.014
Don't know	0.637	-0.008	-0.015	No religion	0.853	0.003	0.014	Heating			
Attended ante-natal classes	0.646	-0.007	-0.008	Catholic	0.152	0.023	0.033	Open fire	0.907	0.002	-0.011
Received fertility treatment	0.893	0.002	-0.005	Protestant	0.127	-0.024	-0.053	Gas/electric fire	0.735	0.005	0.028
Planned parenthood	0.629	0.008	0.018	Anglican	0.958	-0.001	-0.005	Central	0.590	-0.009	-0.021
Delivery				Another type of Christian	0.819	0.004	-0.014	No heating	0.939	-0.001	0.026
Labour induced	0.000	0.058	0.033	Hindu	0.453	0.012	0.022	Damp or condensation at home	0.331	-0.015	-0.029
Labour duration (hours)	0.567	0.009	0.018	Muslim	0.859	-0.003	-0.003	Assets			
Type Delivery:				Other	0.362	0.015	0.024	Telephone	0.403	-0.013	-0.001
Normal	0.807	-0.004	0.004	Ethnicity				Dishwasher	0.189	-0.021	-0.019
Forceps	0.714	0.006	0.009	White	0.838	-0.003	0.007	Own computer	0.806	-0.004	0.001
Vacuum	0.771	-0.005	-0.005	Mixed	0.159	0.022	0.013	Tumble dryer	0.249	-0.018	-0.024
Other	0.163	0.022	0.018	Indian	0.477	-0.011	-0.016	Own/access to car	0.740	-0.005	0.005
Pain relief:				Pakistani/Bangladeshi	0.969	0.001	-0.006	Noisy Neighbours			
None	0.295	-0.017	-0.014	Black	0.745	-0.005	-0.014	Very common	0.793	-0.004	0.010
Gas and air	0.370	0.014	0.020	Other	0.364	0.014	0.031	Fairly common	0.432	0.013	0.009
Pethidine	0.682	0.007	-0.006	Mother's Mother is still alive	0.373	-0.014	-0.016	Not very common	0.513	-0.010	-0.042
Epidural	0.467	0.012	0.000	Lived away from home before 17	0.462	-0.012	-0.005	Not at all common	0.776	0.005	0.031
General anaesthetic	0.784	0.004	0.013	*Mothers Health and Lifestyle*				Rubbish and litter in the area			
TENS	0.658	0.007	0.004	Smoked during pregnancy (avg. cigarettes per	0.931	0.001	0.002	Very common	0.877	-0.002	0.010
Other	0.972	-0.001	0.002	Drank during pregnancy	0.864	-0.003	-0.014	Fairly common	0.319	-0.016	-0.037
Complication:				Longstanding illness	0.575	-0.009	-0.017	Not very common	0.232	0.019	-0.013
None	0.708	0.006	0.012	Limiting longstanding illness	0.523	0.010	0.009	Not at all common	0.801	-0.004	0.042
Breech	0.567	0.009	-0.006	If mother has ever had				Vandalism and damage to property			
Other abnormal	0.901	-0.002	-0.010	Migraine	0.846	-0.003	-0.002	Very common	0.754	0.005	0.019
Very long labour	0.724	0.006	0.019	Hay fever or persistent runny rose	0.044	-0.032	-0.054	Fairly common	0.144	-0.023	-0.055
Very rapid labour	0.130	-0.024	-0.027	Bronchitis	0.458	0.012	0.007	Not very common	0.568	0.009	0.007
Foetal distress (heart)	0.473	-0.011	-0.014	Asthma	0.775	0.005	-0.010	Not at all common	0.754	0.005	0.023
Foetal distress (meconium)	0.174	-0.022	-0.028	Eczema	0.781	0.004	-0.007	Garden			
Other	0.792	0.004	0.007	Back Pain/lumbago/sciatica	0.314	-0.016	-0.042	Own garden	0.463	-0.012	-0.021
Baby				Fits/convulsions/epilepsy	0.031	-0.034	-0.037	Shared garden	0.167	-0.022	-0.022
Female	0.076	0.028	0.029	Diabetes	0.665	0.007	0.017	Social Assistance			
Birth weight (kg)	0.498	-0.011	0.017	Cancer	0.520	-0.010	0.005	Child Tax Credit	0.340	-0.015	-0.017
Premature	0.151	0.023	0.028	Digestive or Bowel disorders	0.000	-0.056	-0.057	Working Families Tax Credit	0.368	0.014	0.001
Length of gestation (days)	0.108	-0.026	-0.041	Diabetes during pregnancy (only)	0.525	0.010	0.034	Income Support	0.495	-0.011	-0.012
Present at birth				*Mothers Socioeconomic Status*				Jobseekers Allowance	0.775	-0.005	0.034
Father	0.733	0.005	0.014	Working during pregnancy	0.700	-0.006	-0.048	Housing Benefit	0.187	0.021	0.037
Mother's friend	0.548	-0.010	-0.019	Live in house	0.884	-0.002	0.005	Council Tax Benefit	0.150	0.023	0.046
Grandmother (in law)	0.114	0.025	0.009	# rooms	0.368	-0.014	-0.036	Invalid Care Allowance	0.190	-0.021	-0.009

Notes: The first column reports the P-value of the hypothesis that the coefficient of exposure to weekend is zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". The second column reports the correlation coefficients of each variable with exposure to weekend (continuous). The third column reports the standardised difference between the groups with exposure to weekend versus no exposure. Sample comprises low educated mothers (NVQ level 2 or less, or those whose NVQ level is unknown but left school before 17), but excludes children born through caesarean sections (either emergency or planned), children placed in intensive care and attriters from MCS4. Attrition variable is defined as equal to one if all the developmental variables have missing values. All variables are dummy variables except for labour duration, birth weight, length of gestation, mother's age and number of rooms.

Source: Millennium Cohort Study.

TABLE E6 — RELATION BETWEEN REGRESSORS AND CUBIC POLYNOMIAL IN HOUR. SUBSAMPLE FOR NOT ATTRITED IN MCS2

Variable	p-value	Variable	p-value	Variable	p-value
Antenatal		Someone else	0.559	Own outright	0.813
Received ante-natal care	0.378	*Mothers Demographics*		Rent from Local Authority	0.913
First ante-natal was before:		Mother's age	0.674	Rent from Housing Association	0.367
0-11 weeks	0.467	Expected qualification at age 16	0.617	Rent privately	0.649
12-13 weeks	0.212	Married	0.663	Live with parents	0.702
≥ 14 weeks	0.946	Religion		Live rent free	0.205
Don't know	0.721	No religion	0.525	Heating	
Attended ante-natal classes	0.337	Catholic	0.357	Open fire	0.768
Received fertility treatment	0.025	Protestant	0.363	Gas/electric fire	0.288
Planned parenthood	0.890	Anglican	0.985	Central	0.101
Delivery		Another type of Christian	0.952	No heating	0.442
Labour induced	0.000	Hindu	0.933	Damp or condensation at home	0.069
Labour duration (hours)	0.372	Muslim	0.091	Assets	
Type Delivery:		Other	0.263	Telephone	0.105
Normal	0.129	Ethnicity		Dishwasher	0.734
Forceps	0.833	White	0.697	Own computer	0.860
Vacuum	0.399	Mixed	0.487	Tumble dryer	0.761
Other	0.727	Indian	0.648	Own/access to car	0.625
Pain relief:		Pakistani/Bangladeshi	0.316	Noisy Neighbours	
None	0.450	Black	0.746	Very common	0.220
Gas and air	0.171	Other	0.432	Fairly common	0.777
Pethidine	0.584	Mother's Mother is still alive	0.683	Not very common	0.382
Epidural	0.172	Lived away from home before 17	0.625	Not at all common	0.480
General anaesthetic	0.570	*Mothers Health and Lifestyle*		Rubbish and litter in the area	
TENS	0.872	Smoked during pregnancy (avg. cigarettes per day)	0.609	Very common	0.676
Other	0.656	Drank during pregnancy	0.131	Fairly common	0.605
Complication:		Longstanding illness	0.938	Not very common	0.818
None	0.965	Limiting longstanding illness	0.445	Not at all common	0.667
Breech	0.694	If mother has ever had		Vandalism and damage to property	
Other abnormal	0.221	Migraine	0.940	Very common	0.529
Very long labour	0.822	Hay fever or persistent runny rose	0.081	Fairly common	0.226
Very rapid labour	0.217	Bronchitis	0.513	Not very common	0.747
Foetal distress (heart)	0.637	Asthma	0.882	Not at all common	0.550
Foetal distress (meconium)	0.592	Eczema	0.160	Garden	
Other	0.628	Back Pain/lumbago/sciatica	0.329	Own garden	0.125
Baby		Fits/convulsions/epilepsy	0.145	Shared garden	0.784
Female	0.330	Diabetes	0.763	Social Assistance	
Birth weight (kg)	0.723	Cancer	0.596	Child Tax Credit	0.246
Premature	0.626	Digestive or Bowel disorders	0.511	Working Families Tax Credit	0.558
Length of gestation (days)	0.499	Diabetes during pregnancy (only)	0.961	Income Support	0.965
Present at birth		*Mothers Socioeconomic Status*		Jobseekers Allowance	0.206
Father	0.407	Working during pregnancy	0.300	Housing Benefit	0.054
Mother's friend	0.291	Live in house	0.571	Council Tax Benefit	0.028
Grandmother (in law)	0.114	# rooms	0.328	Invalid Care Allowance	0.575

Notes: Each cell reports the P-value of the joint hypothesis that the coefficients of a cubic polynomial in hour are jointly zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". Sample comprises low educated mothers (NVQ level 2 or less, or those whose NVQ level is unknown but left school before 17), but excludes children born through caesarean sections (either emergency or planned), children placed in intensive care and attriters from MCS2. Attrition variable is defined as equal to one if all the developmental variables have missing values. All variables are dummy variables except for labour duration, birth weight, length of gestation, mother's age and number of rooms.

Source: Millennium Cohort Study.

TABLE E7 — RELATION BETWEEN REGRESSORS AND CUBIC POLYNOMIAL IN HOUR. SUBSAMPLE FOR NOT ATTRITED IN MCS3

Variable	p-value	Variable	p-value	Variable	p-value
Antenatal		Someone else	0.437	Own outright	0.213
Received ante-natal care	0.372	*Mothers Demographics*		Rent from Local Authority	0.637
First ante-natal was before:		Mother's age	0.267	Rent from Housing Association	0.363
0-11 weeks	0.311	Expected qualification at age 16	0.526	Rent privately	0.657
12-13 weeks	0.249	Married	0.694	Live with parents	0.657
≥ 14 weeks	0.779	Religion		Live rent free	0.127
Don't know	0.714	No religion	0.568	Heating	
Attended ante-natal classes	0.580	Catholic	0.248	Open fire	0.658
Received fertility treatment	0.046	Protestant	0.757	Gas/electric fire	0.616
Planned parenthood	0.945	Anglican	0.954	Central	0.006
Delivery		Another type of Christian	0.878	No heating	0.384
Labour induced	0.000	Hindu	0.621	Damp or condensation at home	0.022
Labour duration (hours)	0.429	Muslim	0.041	Assets	
Type Delivery:		Other	0.683	Telephone	0.717
Normal	0.226	Ethnicity		Dishwasher	0.705
Forceps	0.890	White	0.597	Own computer	0.971
Vacuum	0.393	Mixed	0.131	Tumble dryer	0.540
Other	0.553	Indian	0.439	Own/access to car	0.408
Pain relief:		Pakistani/Bangladeshi	0.095	Noisy Neighbours	
None	0.527	Black	0.836	Very common	0.304
Gas and air	0.402	Other	0.718	Fairly common	0.407
Pethidine	0.298	Mother's Mother is still alive	0.792	Not very common	0.629
Epidural	0.374	Lived away from home before 17	0.546	Not at all common	0.505
General anaesthetic	0.359	*Mothers Health and Lifestyle*		Rubbish and litter in the area	
TENS	0.786	Smoked during pregnancy (avg. cigarettes per day)	0.382	Very common	0.545
Other	0.887	Drank during pregnancy	0.200	Fairly common	0.829
Complication:		Longstanding illness	0.517	Not very common	0.788
None	0.931	Limiting longstanding illness	0.391	Not at all common	0.669
Breech	0.998	If mother has ever had		Vandalism and damage to property	
Other abnormal	0.348	Migraine	0.905	Very common	0.376
Very long labour	0.845	Hay fever or persistent runny rose	0.179	Fairly common	0.576
Very rapid labour	0.176	Bronchitis	0.645	Not very common	0.919
Foetal distress (heart)	0.428	Asthma	0.961	Not at all common	0.494
Foetal distress (meconium)	0.331	Eczema	0.445	Garden	
Other	0.878	Back Pain/lumbago/sciatica	0.832	Own garden	0.156
Baby		Fits/convulsions/epilepsy	0.172	Shared garden	0.927
Female	0.449	Diabetes	0.901	Social Assistance	
Birth weight (kg)	0.789	Cancer	0.168	Child Tax Credit	0.672
Premature	0.682	Digestive or Bowel disorders	0.018	Working Families Tax Credit	0.297
Length of gestation (days)	0.388	Diabetes during pregnancy (only)	0.998	Income Support	0.999
Present at birth		*Mothers Socioeconomic Status*		Jobseekers Allowance	0.103
Father	0.495	Working during pregnancy	0.070	Housing Benefit	0.208
Mother's friend	0.771	Live in house	0.367	Council Tax Benefit	0.113
Grandmother (in law)	0.504	# rooms	0.061	Invalid Care Allowance	0.357

Notes: Each cell reports the P-value of the joint hypothesis that the coefficients of a cubic polynomial in hour are jointly zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". Sample comprises low educated mothers (NVQ level 2 or less, or those whose NVQ level is unknown but left school before 17), but excludes children born through caesarean sections (either emergency or planned), children placed in intensive care and attriters from MCS3. Attrition variable is defined as equal to one if all the developmental variables have missing values. All variables are dummy variables except for labour duration, birth weight, length of gestation, mother's age and number of rooms.

Source: Millennium Cohort Study.

TABLE E8 — RELATION BETWEEN REGRESSORS AND CUBIC POLYNOMIAL IN HOUR. SUBSAMPLE FOR NOT ATTRITED IN MCS4

Variable	p-value	Variable	p-value	Variable	p-value
Antenatal		Someone else	0.632	Own outright	0.566
Received ante-natal care	0.292	*Mothers Demographics*		Rent from Local Authority	0.880
First ante-natal was before:		Mother's age	0.312	Rent from Housing Association	0.699
0-11 weeks	0.696	Expected qualification at age 16	0.682	Rent privately	0.828
12-13 weeks	0.257	Married	0.607	Live with parents	0.863
≥ 14 weeks	0.722	Religion		Live rent free	0.301
Don't know	0.370	No religion	0.802	Heating	
Attended ante-natal classes	0.616	Catholic	0.180	Open fire	0.733
Received fertility treatment	0.097	Protestant	0.296	Gas/electric fire	0.730
Planned parenthood	0.847	Anglican	0.905	Central	0.207
Delivery		Another type of Christian	0.939	No heating	0.690
Labour induced	0.000	Hindu	0.795	Damp or condensation at home	0.425
Labour duration (hours)	0.230	Muslim	0.212	Assets	
Type Delivery:		Other	0.521	Telephone	0.800
Normal	0.146	Ethnicity		Dishwasher	0.584
Forceps	0.941	White	0.904	Own computer	0.974
Vacuum	0.275	Mixed	0.376	Tumble dryer	0.671
Other	0.612	Indian	0.360	Own/access to car	0.836
Pain relief:		Pakistani/Bangladeshi	0.328	Noisy Neighbours	
None	0.704	Black	0.598	Very common	0.590
Gas and air	0.577	Other	0.332	Fairly common	0.630
Pethidine	0.246	Mother's Mother is still alive	0.662	Not very common	0.352
Epidural	0.286	Lived away from home before 17	0.791	Not at all common	0.644
General anaesthetic	0.102	*Mothers Health and Lifestyle*		Rubbish and litter in the area	
TENS	0.948	Smoked during pregnancy (avg. cigarettes per day)	0.593	Very common	0.508
Other	0.943	Drank during pregnancy	0.254	Fairly common	0.455
Complication:		Longstanding illness	0.669	Not very common	0.651
None	0.981	Limiting longstanding illness	0.756	Not at all common	0.852
Breech	0.996	If mother has ever had		Vandalism and damage to property	
Other abnormal	0.184	Migraine	0.999	Very common	0.764
Very long labour	0.573	Hay fever or persistent runny rose	0.132	Fairly common	0.269
Very rapid labour	0.265	Bronchitis	0.512	Not very common	0.812
Foetal distress (heart)	0.537	Asthma	0.935	Not at all common	0.642
Foetal distress (meconium)	0.412	Eczema	0.298	Garden	
Other	0.658	Back Pain/lumbago/sciatica	0.697	Own garden	0.320
Baby		Fits/convulsions/epilepsy	0.199	Shared garden	0.613
Female	0.448	Diabetes	0.855	Social Assistance	
Birth weight (kg)	0.746	Cancer	0.244	Child Tax Credit	0.577
Premature	0.245	Digestive or Bowel disorders	0.005	Working Families Tax Credit	0.429
Length of gestation (days)	0.250	Diabetes during pregnancy (only)	0.939	Income Support	0.889
Present at birth		*Mothers Socioeconomic Status*		Jobseekers Allowance	0.048
Father	0.368	Working during pregnancy	0.177	Housing Benefit	0.216
Mother's friend	0.343	Live in house	0.366	Council Tax Benefit	0.085
Grandmother (in law)	0.491	# rooms	0.092	Invalid Care Allowance	0.364

Notes: Each cell reports the P-value of the joint hypothesis that the coefficients of a cubic polynomial in hour are jointly zero in a separate OLS regression in which the dependent variable is listed in the columns titled "Variable". Sample comprises low educated mothers (NVQ level 2 or less, or those whose NVQ level is unknown but left school before 17), but excludes children born through caesarean sections (either emergency or planned), children placed in intensive care and attriters from MCS3. Attrition variable is defined as equal to one if all the developmental variables have missing values. All variables are dummy variables except for labour duration, birth weight, length of gestation, mother's age and number of rooms.

Source: Millennium Cohort Study.

TABLE E9 — COMPARISON BETWEEN ATTRITERS AND NON-ATTRITERS

Variable	Non-attriters	Attriters	t-stat diff	Variable	Non-attriters	Attriters	t-stat diff	Variable	Non-attriters	Attriters	t-stat diff
Antenatal				Grandmother (in law)	0.234	0.273	-3.392	Own outright	0.026	0.028	-0.571
Received ante-natal care	0.961	0.937	4.137	Someone else	0.102	0.121	-2.270	Rent from Local Authority	0.256	0.335	-6.520
First ante-natal was before:				*Mothers Demographics*				Rent from Housing Association	0.092	0.120	-3.341
0-11 weeks	0.416	0.373	3.296	Age	27.249	25.356	11.897	Rent privately	0.086	0.117	-3.846
12-13 weeks	0.340	0.339	0.071	Had attained expected educ qual. at age 16	0.615	0.498	8.860	Live with parents	0.050	0.068	-2.949
≥ 14 weeks	0.180	0.196	-1.509	Married	0.498	0.385	8.628	Live rent free	0.014	0.022	-2.232
Don't know	0.026	0.029	-0.755	Religion				Heating			
Attended ante-natal classes	0.260	0.221	3.381	No religion	0.533	0.584	-3.904	Open fire	0.037	0.031	1.131
Received fertility treatment	0.018	0.010	2.404	Catholic	0.045	0.042	0.557	Gas/electric fire	0.302	0.309	-0.533
Planned parenthood	0.487	0.401	6.538	Protestant	0.029	0.021	1.830	Central	0.896	0.875	2.474
Delivery				Anglican	0.119	0.061	7.748	No heating	0.010	0.010	0.197
Labour induced	0.303	0.309	-0.504	Another type of Christian	0.041	0.029	2.397	Damp at home	0.161	0.171	-1.017
Labour duration (hours)	8.636	9.066	-1.548	Hindu	0.010	0.008	0.806	Assets			
Type Delivery:				Muslim	0.062	0.076	-2.037	Telephone	0.960	0.917	6.620
Normal	0.898	0.906	-1.071	Other	0.009	0.008	0.525	Dishwasher	0.228	0.148	7.804
Forceps	0.039	0.036	0.501	Ethnicity				Own computer	0.437	0.318	9.341
Vacuum	0.066	0.061	0.793	White	0.863	0.815	4.943	Tumble dryer	0.611	0.571	3.056
Other	0.009	0.006	1.045	Mixed	0.008	0.016	-2.512	Own/access to car	0.773	0.666	8.871
Pain relief:				Indian	0.022	0.021	0.222	Noisy Neighbours			
None	0.102	0.102	-0.051	Pakistani/Bangladeshi	0.075	0.096	-2.752	Very common	0.075	0.110	-4.537
Gas and air	0.797	0.793	0.307	Black	0.023	0.037	-3.139	Fairly common	0.116	0.130	-1.637
Pethidine	0.359	0.354	0.397	Other	0.009	0.016	-2.299	Not very common	0.410	0.382	2.213
Epidural	0.197	0.214	-1.626	Mother's Mother is still alive	0.937	0.925	1.685	Not at all common	0.399	0.378	1.620
General anaesthetic	0.003	0.002	0.459	Lived away from home before 17	0.181	0.236	-5.055	Rubbish and litter in the area			
TENS	0.086	0.053	4.973	*Mothers Health and Lifestyle*				Very common	0.135	0.176	-4.261
Other	0.037	0.028	2.088	Smoked during pregnancy (# avg. cigarettes per day)	3.350	3.951	-3.709	Fairly common	0.214	0.232	-1.586
Complication:				Drank during pregnancy	0.263	0.224	3.448	Not very common	0.382	0.348	2.610
None	0.752	0.773	-1.856	Longstanding illness	0.216	0.181	3.332	Not at all common	0.269	0.244	2.214
Breech	0.003	0.004	-0.499	Limiting longstanding illness	0.100	0.094	0.759	Vandalism/damage to property in the area			
Other abnormal	0.019	0.020	-0.376	If mother has ever had				Very common	0.101	0.123	-2.685
Very long labour	0.045	0.052	-1.198	Migraine	0.228	0.211	1.577	Fairly common	0.153	0.168	-1.527
Very rapid labour	0.030	0.019	2.787	Hay fever or persistent runny rose	0.237	0.237	0.074	Not very common	0.408	0.388	1.575
Foetal distress (heart)	0.078	0.065	2.005	Bronchitis	0.073	0.064	1.392	Not at all common	0.338	0.321	1.372
Foetal distress (meconium)	0.040	0.035	0.869	Asthma	0.180	0.167	1.374	Garden			
Other	0.083	0.073	1.441	Eczema	0.192	0.166	2.576	Own garden	0.859	0.771	8.415
Baby				Back Pain/lumbago/sciatica	0.223	0.199	2.233	Shared garden	0.032	0.062	-5.186
Female	0.506	0.481	1.938	Fits/convulsions/epilepsy	0.022	0.031	-2.066	Social Assistance			
Birth weight (kg)	3.370	3.341	2.161	Diabetes	0.012	0.009	1.382	Child Tax Credit	0.150	0.098	5.993
Breastfeeding 90 days	0.262	0.185	7.007	Cancer	0.010	0.010	0.149	Working Families Tax Credit	0.255	0.235	1.705
Born during weekend	0.430	0.416	1.068	Digestive or Bowel disorders	0.081	0.071	1.419	Income Support	0.243	0.378	-10.909
Premature	0.043	0.048	-0.883	Diabetes during pregnancy	0.009	0.006	1.045	Jobseekers Allowance	0.044	0.048	-0.703
Length of gestation (days)	279.3	278.8	1.847	*Mothers Socioeconomic Status*				Housing Benefit	0.220	0.304	-7.152
Present at birth				Working during pregnancy	0.559	0.435	9.416	Council Tax Benefit	0.208	0.281	-6.343
Father	0.822	0.754	6.240	Live in house	0.860	0.777	8.037	Invalid Care Allowance	0.016	0.012	1.420
Mother's friend	0.042	0.060	-3.167	# rooms	5.131	4.859	7.800				

Notes. Figures in columns titled "Non-attriters" and "Attriters" are sample means of the variable listed under the column titled "Variable". The t-statistic of the difference between the means listed in these two columns is shown under the column titled "t-stat diff". Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Attriters=1 if attrit from the survey in at least 1 wave; Non-attriters=1 if never attrit from the survey. All variables are dummy variables, with the exception of birth weight, length of gestation, mother's age, smoked during pregnancy and number of rooms.

Source: Millennium Cohort Study.

TABLE E10 — EFFECT OF BREASTFEEDING ON COGNITIVE OUTCOMES AT AGES 5

	5 years outcomes			5 years outcomes based on sample available at 7 years (MCS4)		
	Expressive Language	Pictorial Reasoning	Visuo-Spatial	Expressive Language	Pictorial Reasoning	Visuo-Spatial
Panel A: Exclusion Restriction Exposure to Weekend						
NTSLS	8.583	3.212	4.892	4.414	1.402	6.111
	(5.164)	(4.162)	(6.753)	(5.182)	(4.287)	(6.935)
TSLS	22.183	14.443	23.256	11.729	5.320	32.227
	(19.729)	(15.538)	(25.323)	(13.227)	(10.999)	(20.823)
OLS	1.579	1.100	1.119	1.474	1.237	1.118
	(0.544)	(0.442)	(0.727)	(0.578)	(0.480)	(0.783)
F statistic	5.386	5.57	5.498	7.533	7.844	7.682
P-Value Joint	0.020	0.018	0.019	0.006	0.005	0.006
Mean	104.10	80.24	85.43	104.70	80.50	86.29
SD	15.64	11.75	19.70	15.35	11.71	19.17
Observations	4,349	4,355	4,333	3,687	3,691	3,676

Notes: Each cell reports coefficient of breastfeeding for at least 90 days from separate regressions in which the dependent variable is listed at the top of the column and the estimation method is listed in the left hand column (NTSLS denotes non-linear two-stage least squares; TSLS denotes two-stage least squares; OLS denotes ordinary least squares). Control variables include those listed in Tables 2 and B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bank holiday (137 covariates in total). In panel A the exclusion restriction from the second-stage regressions is exposure to weekend while in Panel B is the cubic polynomial in hour. F statistic and P-value correspond to the null hypothesis that the coefficient(s) on the excluded variable(s) is zero, as estimated from an OLS regression where the dependent variable is breastfeeding for at least 90 days, and controls are as noted already. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Standard errors in parentheses.

Source: Millennium Cohort Study.

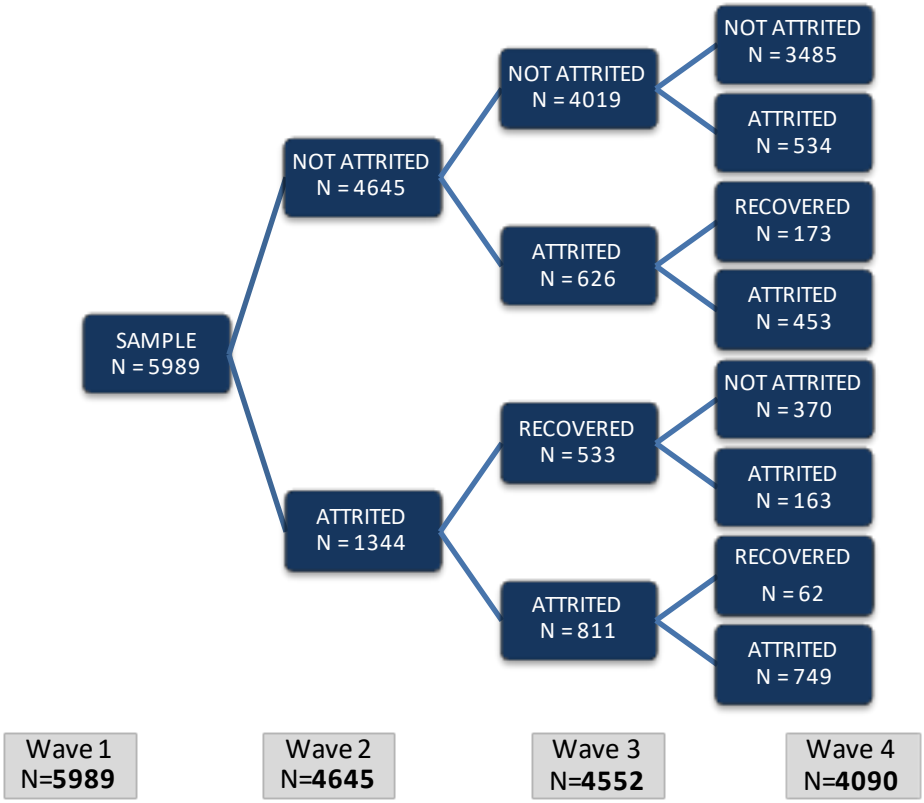

FIGURE E1. ATTRITION AND RECOVERY BY WAVE FOR LOW EDUCATED MOTHERS

Notes: The figure shows how the initial sample of 5,989 children born naturally (excludes C-sections) who have not been in intensive care and whose mother is low educated (NVQ level 2 or less, or unknown NVQ level but left school before age 17) have attrited and recovered. Attrition is defined as equal to 1 if child was not observed in the subsequent wave and 0 otherwise.

Appendix F: Additional Tables & Figures

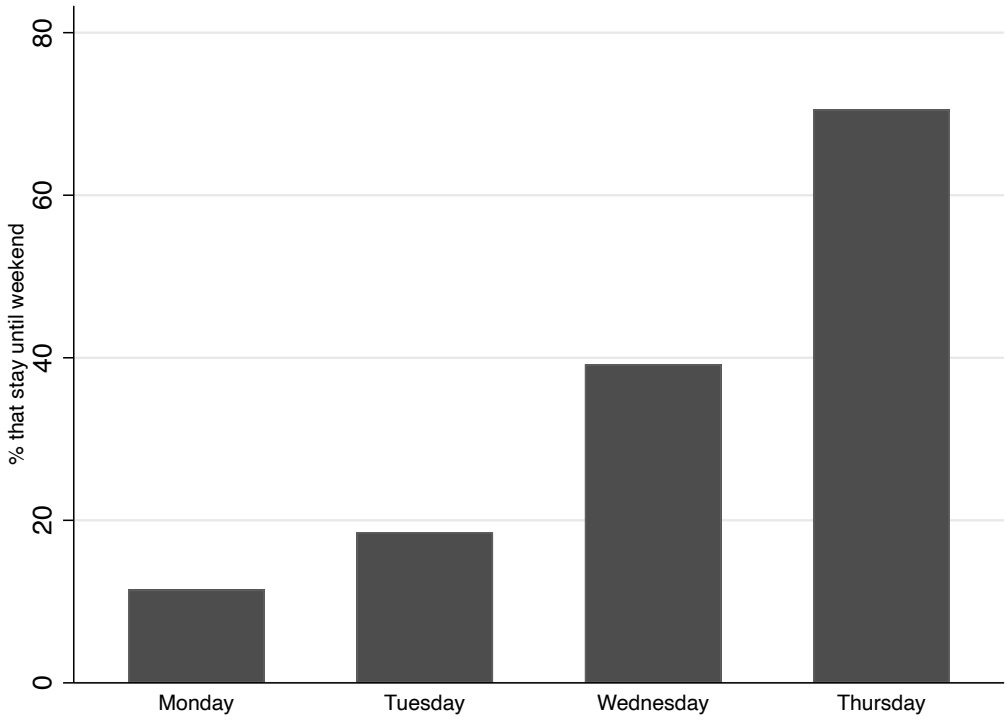

FIGURE F1. ACTUAL EXPOSURE TO WEEKEND FOR THOSE BORN ON MONDAY-THURSDAY

Notes. The figure shows the percentage of children who spent at least part of the weekend in hospital, according to their day of birth. Weekend is defined as the period from Friday 8am to Sunday 11.59pm. Sample comprises low educated mothers, but excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care.

Source: Millennium Cohort Study.

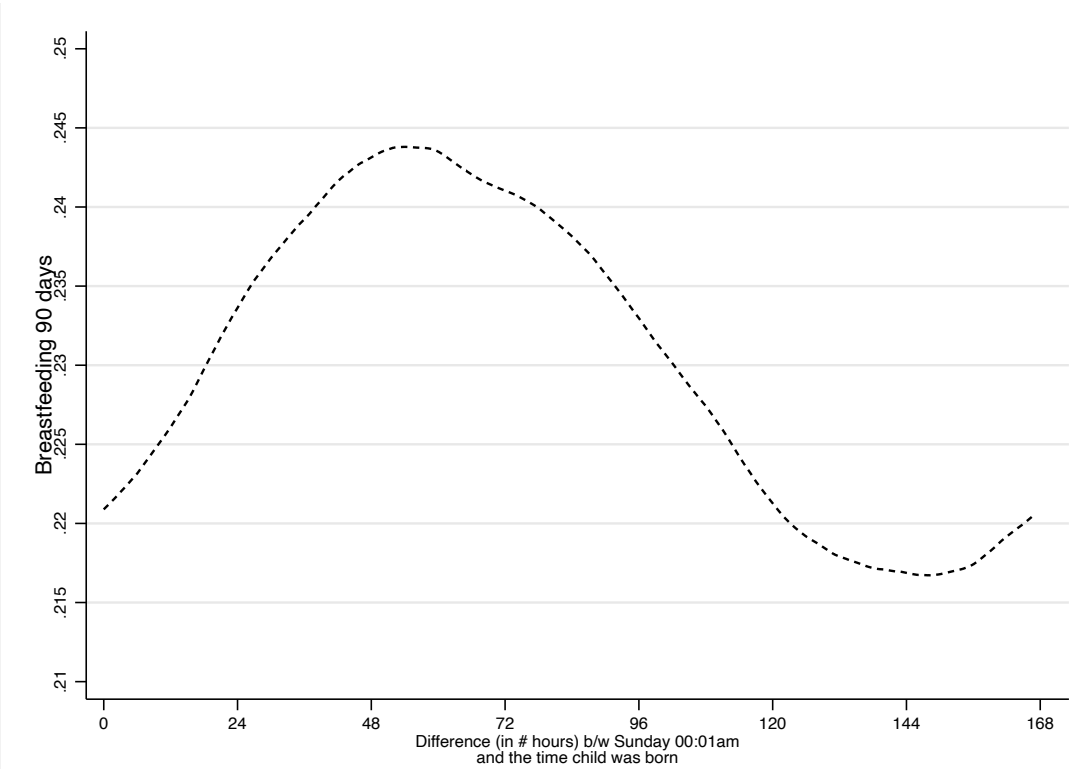

FIGURE F2. BREASTFEEDING BY HOUR OF BIRTH (NON-PARAMETRIC)

Notes: The horizontal axis shows the hour of birth within the week (0 corresponds to Sunday 00:01-00:59 and 163 to 23:00-23:59 on Saturday). The dashed lines is the estimate of the function F(hour) on the partially linear regression defined as $Y= F(hour)+X\beta+ \varepsilon$, where hour is the variable in the horizontal axis, X is a set of control variables (those in Tables 2 and B2) and Y is defined as equal to 1 if the child was breastfed for at least 90 days, and 0 otherwise. F(hour) is estimated following Robinson (1988) using Kernel regression (triangular Kernel with bandwidth of 72). Sample comprises low educated mothers (NVQ level 2 or less, or unknown NVQ level but left school before age 17), but excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care.

Source: Millennium Cohort Study.

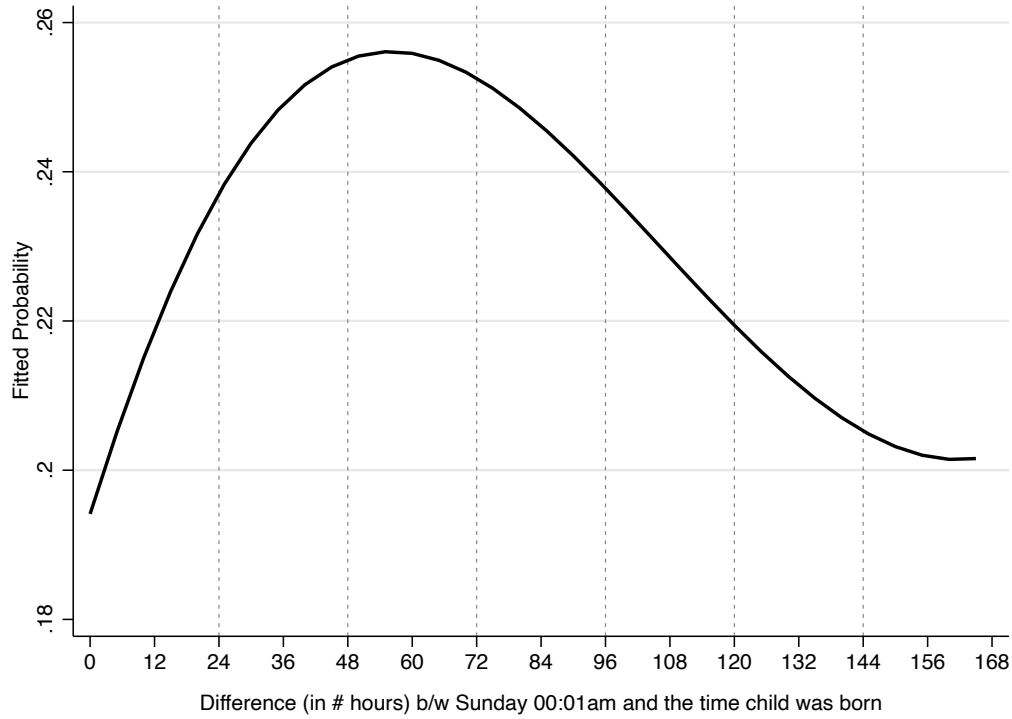

FIGURE F3. BREASTFEEDING BY HOUR OF BIRTH (CUBIC POLYNOMIAL)

Notes: The horizontal axis shows the hour of birth within the week (0 corresponds to Sunday 00:01- 00:59 and 163 to 23:00-23:59 on Saturday). The vertical axis shows the predicted probability that a child will be breastfed for at least 90 days computed using a Probit model estimated using a cubic polynomial on the variable in the horizontal axis and the variables listed in Table 2 and B2 as control variables. The probability is estimated for the average value of the control variables. Sample comprises low educated mothers (NVQ level 2 or less, or unknown NVQ level but left school before age 17), but excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care.

Source: Millennium Cohort Study.

TABLE F1 — BREASTFEEDING SUPPORT AND BREASTFEEDING RATES BY DAY OF BIRTH

	[1]	[2]	[3]	[4]	[5]	[6]
	High Educated					
Data Source →	MUS 2007					MCS 2000-01
Day of Birth ↓	Received consistent advice	Received practical help	Received active support	Mixed feeding in the first few days	Some breastfeeding in the first few days	Breastfed for at least 90 days
Sun	-0.013	0.002	0.000	0.010	0.002	-0.043
	(0.014)	(0.014)	(0.014)	(0.012)	(0.012)	(0.027)
Tue	-0.007	-0.013	-0.006	0.006	0.017	-0.017
	(0.014)	(0.014)	(0.013)	(0.012)	(0.012)	(0.026)
Wed	0.009	-0.004	0.003	0.02	0.005	-0.045
	(0.014)	(0.014)	(0.013)	(0.012)	(0.012)	(0.026)
Thurs	-0.007	-0.009	-0.011	-0.004	0.003	-0.036
	(0.014)	(0.014)	(0.013)	(0.012)	(0.012)	(0.026)
Fri	-0.008	-0.005	-0.002	0.001	-0.010	-0.04
	(0.014)	(0.014)	(0.013)	(0.012)	(0.012)	(0.026)
Sat	0.006	0.007	0.006	0.006	0.007	-0.043
	(0.014)	(0.014)	(0.013)	(0.012)	(0.012)	(0.026)
Monday Mean	0.776	0.793	0.799	0.162	0.832	0.544
P-value Joint	0.654	0.824	0.883	0.524	0.422	0.537
P-value Fri-Sun	0.520	0.858	0.928	0.852	0.518	0.292
Observations	12,946	12,580	12,820	13,765	13,765	5,354

Notes: The table reports coefficients from an OLS regression over day of week dummies (Monday omitted). The dependent variable is listed at the top of the column. Columns 1-5 are from the Maternity Users Survey (MUS). Column 6 is from the Millennium Cohort Study (MCS). All columns exclude emergency and planned C-sections, and column 6 additionally exclude babies placed in intensive care. Standard errors in parentheses.

Source: Millennium Cohort Study.

TABLE F2 — FIRST STAGE. BREASTFED FOR AT LEAST 90 DAYS. COEFFICIENT ESTIMATES

	High Educated Mothers					
	[1]	[2]	[3]	[4]	[5]	[6]
	PROBIT	OLS	OLS	PROBIT	OLS	OLS
Exposure to Weekend	0.035	0.013	0.012			
	(0.049)	(0.017)	(0.017)			
Hour				-0.002	-0.001	-0.001
				(0.004)	(0.001)	(0.001)
(Hour^2)/100				0.003	0.001	0.001
				(0.005)	(0.002)	(0.002)
(Hour^3)/10000				-0.001	-0.000	-0.001
				(0.002)	(0.001)	(0.001)
P-value	0.481	0.453	0.484	0.866	0.842	0.840
F-stat		0.563	0.490		0.277	0.280
Hospital FE	No	No	Yes	No	No	Yes
Observations	5,354	5,354	5,354	5,354	5,354	5,354

Notes: Each column reports the coefficients from a regression in which the dependent variable is whether the child was breastfed for at least 90 days, and the independent variables include the exclusion restrictions listed in the first column (exposure to weekend or cubic polynomial in hour), and all of the variables listed in Tables 2 and Appendix Table B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy if highest qualification is missing but left school before age 17), month of birth, interview months, country dummies, and whether the baby was born on a bank holiday (137 covariates in total). The model (Probit or OLS) is noted at the top of the column. The P-value and F-stat refer to the null hypothesis that the coefficient(s) of the instrument is zero or jointly zero. Sample excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Low educated mothers are those with NVQ level 2 or less, or unknown NVQ level but that left school before 17), High educated mothers are those with NVQ level 3 or higher. Standard errors in parentheses.

Source: Millennium Cohort Study.

TABLE F3 — OLS REGRESSIONS OF BREASTFEEDING AND COGNITIVE DEVELOPMENT ON COVARIATES

Covariates	Depedent vble: Breastfeeding	Depedent vble: Cognitive index	Covariates	Depedent vble: Breastfeeding	Depedent vble: Cognitive index
[1]	[2]	[3]	[4]	[5]	[6]
Expected educ. at age 16	-0.068	-0.094	Gestational period	0.001	0.000
	(0.0156)	(0.0207)		(0.000738)	(0.000946)
Overseas qualification	-0.080	-0.154	Premature baby	-0.041	-0.040
	(0.0147)	(0.0211)		(0.0321)	(0.0452)
Worked during pregnancy	-0.023	0.081	Father present at birth	0.022	0.059
	(0.0138)	(0.0183)		(0.0172)	(0.0235)
Child Tax Credit	0.021	0.041	Friend present at birth	-0.026	0.014
	(0.0200)	(0.0240)		(0.0273)	(0.0370)
Working Families Tax Credit	-0.013	-0.063	Grandmother present at birth	0.003	0.035
	(0.0160)	(0.0201)		(0.0149)	(0.0199)
Income Support	-0.036	-0.128	Someone else present at birth	-0.003	0.000
	(0.0214)	(0.0283)		(0.0187)	(0.0254)
Jobseekers Allowance	0.005	-0.057	Labor induction	-0.013	-0.051
	(0.0299)	(0.0393)		(0.0129)	(0.0168)
Housing Benefit	0.036	-0.052	Forceps	0.015	-0.041
	(0.0332)	(0.0397)		(0.0340)	(0.0397)
Council Tax Benefit	-0.045	0.064	Vacuum extraction	-0.010	-0.034
	(0.0324)	(0.0386)		(0.0264)	(0.0338)
Invalid Care Allowance	-0.062	-0.010	Other non-natural delivery	0.022	0.026
	(0.0431)	(0.0661)		(0.0778)	(0.105)
Live in house	-0.018	-0.083	Pain relief: gas	0.006	0.039
	(0.0253)	(0.0321)		(0.0200)	(0.0259)
# rooms	0.011	0.001	Pain relief: pethidine	-0.007	0.001
	(0.00574)	(0.00670)		(0.0132)	(0.0167)
Own house outright	-0.003	-0.002	Pain relief: epidural	-0.040	0.053
	(0.0430)	(0.0461)		(0.0165)	(0.0222)
Rent from Local Authority	-0.037	-0.0276	Pain relief: general anestesia	0.0861	-0.165
	(0.0194)	(0.0265)		(0.105)	(0.170)
Rent from Housing Association	-0.019	-0.012	Pain relief: tens machine	0.038	0.047
	(0.0251)	(0.0328)		(0.0245)	(0.0299)
Rent privately	0.005	-0.004	Pain relief: other	-0.027	0.071
	(0.0245)	(0.0314)		(0.0335)	(0.0455)
Live with parents	-0.041	-0.026	Pain relief: none	0.019	-0.002
	(0.0285)	(0.0390)		(0.0283)	(0.0361)
Live rent free	-0.091	0.046	Mother did not have labor	-0.0151	-0.0801
	(0.0446)	(0.0553)		(0.0784)	(0.0892)
Own garden	0.030	0.044	Labor duration	0.000	0.001
	(0.0249)	(0.0313)		(0.000606)	(0.000807)
Shared garden	-0.010	-0.035	Complications: none	-0.024	0.058
	(0.0297)	(0.0398)		(0.0348)	(0.0428)
Heating: Open fire	0.061	-0.083	Complications: breech	-0.046	0.187
	(0.0362)	(0.0443)		(0.120)	(0.144)
Heating: Gas/electric fire	-0.013	-0.009	compl_abn_lie_m	0.024	0.125
	(0.0156)	(0.0193)		(0.0502)	(0.0602)
Central Heating	0.008	0.009	Complication: very long labor	-0.026	0.018
	(0.0222)	(0.0281)		(0.0373)	(0.0470)
No Heating	0.001	0.153	Complication: very rapid labor	0.004	0.005
	(0.0607)	(0.0796)		(0.0439)	(0.0542)
Damp or condensation at home	0.025	0.019	Complication: foetal distress (heart)	0.003	0.068
	(0.0162)	(0.0215)		(0.0344)	(0.0428)
Telephone	0.009	0.029	Complication: foetal distress (meconium)	-0.007	0.047
	(0.0221)	(0.0335)		(0.0379)	(0.0460)
Dishwasher	0.027	0.025	Complication: other	0.004	0.031
	(0.0181)	(0.0212)		(0.0351)	(0.0442)
Own computer	0.032	0.047	Received fertility treatment	-0.028	0.003
	(0.0139)	(0.0171)		(0.0484)	(0.0612)
Tumble dryer	-0.028	-0.028	Planned ferticlity	0.016	0.014
	(0.0131)	(0.0169)		(0.0135)	(0.0172)
Own/access to car	-0.007	0.039	First antenatal: 0-11 weeks	-0.037	0.053
	(0.0147)	(0.0198)		(0.0295)	(0.0362)
Noisy Neighbours: fairly common	0.052	0.049	First antenatal: 12-13 weeks	-0.0172	0.0600
	(0.0254)	(0.0357)		(0.0297)	(0.0368)
Noisy Neighbours: not very common	0.007	-0.004	First antenatal: 14 weeks or more	-0.050	0.069
	(0.0188)	(0.0264)		(0.0305)	(0.0382)
Noisy Neighbours: not at all common	0.004	0.029	First antenatal: unknown	0.001	0.012
	(0.0200)	(0.0279)		(0.0441)	(0.0584)
Rubbish in the street: fairly common	0.000	-0.026	Attended ante-natal classes	0.043	0.064
	(0.0198)	(0.0269)		(0.0148)	(0.0177)
Rubbish in the street: not very common	0.005	-0.029	Longstanding illness	-0.010	-0.034

	(0.0205)	(0.0273)		(0.0203)	(0.0253)
Rubbish in the street: not at all common	0.015	-0.002	Limiting longstanding illness	-0.018	0.056
	(0.0246)	(0.0313)		(0.0259)	(0.0321)
Vandalism: fairly common	0.024	0.039	Migraine	-0.016	-0.007
	(0.0217)	(0.0304)		(0.0140)	(0.0184)
Vandalism: not very common	0.037	0.092	Hay fever or persistent runny rose	0.018	0.016
	(0.0208)	(0.0285)		(0.0145)	(0.0180)
Vandalism: not at all common	0.034	0.053	Bronchitis	-0.020	-0.036
	(0.0235)	(0.0317)		(0.0223)	(0.0285)
Roman Catholic	0.021	0.000	Asthma	0.036	0.027
	(0.0225)	(0.0288)		(0.0168)	(0.0217)
Protestant	0.081	0.032	Eczema	0.002	0.005
	(0.0408)	(0.0478)		(0.0153)	(0.0194)
Anglican	0.016	-0.050	Back Pain/lumbago/sciatica	-0.015	0.002
	(0.0180)	(0.0227)		(0.0149)	(0.0186)
Other Christian religion	0.105	-0.011	Fits/convulsions/epilepsy	-0.053	0.004
	(0.0280)	(0.0318)		(0.0352)	(0.0472)
Hindu	0.097	-0.050	Diabetes	-0.082	0.047
	(0.0861)	(0.0968)		(0.0955)	(0.136)
Muslim	0.220	0.010	Cancer	0.032	0.010
	(0.0565)	(0.0602)		(0.0567)	(0.0651)
Other non Christian religion	-0.008	-0.062	Digestive or Bowel disorders	-0.017	0.020
	(0.0772)	(0.0850)		(0.0226)	(0.0275)
Mother's age	0.005	-0.015	Diabetes during pregnancy	0.105	-0.218
	(0.00841)	(0.0105)		(0.118)	(0.166)
Mother's age (squared term)	0.00004	0.00034	Smoked during pregnancy (# avg. cig. per day)	-0.005	-0.001
	(0.000153)	(0.000188)		(0.000903)	(0.00145)
Ethnicity: mixed	0.253	-0.047	Drank during pregnancy	0.034	0.041
	(0.0678)	(0.0849)		(0.0137)	(0.0170)
Ethnicity: Indian	0.169	-0.078	Married	-0.019	-0.050
	(0.0739)	(0.0818)		(0.0219)	(0.0293)
Ethnicity: Pakistani	0.014	-0.293	Cohabitating	-0.031	-0.050
	(0.0620)	(0.0681)		(0.0188)	(0.0265)
Ethnicity: Black	0.257	-0.178	Other type of relationship	0.032	-0.030
	(0.0511)	(0.0535)		(0.0658)	(0.0772)
Ethnicity: other non-white	0.298	-0.103	Wales	-0.036	0.212
	(0.0765)	(0.0801)		(0.115)	(0.178)
Child's age	0.035	-0.080	Scotland	-0.246	-0.076
	(0.0282)	(0.0304)		(0.120)	(0.201)
Child's age (squared term)	-0.001	0.001	Mother's Mother is still alive	-0.014	0.042
	(0.000480)	(0.000519)		(0.0232)	(0.0317)
Child's age (cubic term)	0.000	0.000	Lived away from home before 17	0.053	0.040
	(2.63e-06)	(2.84e-06)		(0.0149)	(0.0194)
Girl	-0.008	0.136	Born on bank holiday	-0.008	-0.052
	(0.0116)	(0.0152)		(0.0422)	(0.0542)
Baby birth weight	-0.001	0.048			
	(0.0132)	(0.0178)			
Observations	5,015	5,015			
R-squared	0.219	0.249			

Notes: Columns 2 and 5 report coefficients of an OLS regression of breastfeeding for at least 90 days on the covariates listed in columns 1 and 4. Columns 3 and 6 report coefficients of an OLS regression of the cognitive development index on the covariates listed in columns 1 an 4. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Standard errors in parentheses.

Source: Millennium Cohort Study.

TABLE F4 — CHARACTERISTICS OF COMPLIERS

Characteristic (binary) ↓	[1] Overall mean	[2] Mean amongst the compilers
Mother higher education (=high school diploma)	0.57	0.83
Higher SES	0.50	0.81
Had paid job during pregnancy (*)	0.51	1.03
Mother is in a relantionship	0.75	0.93
Smoked during pregnancy	0.46	0.53
Drank during pregnancy	0.25	0.28
Planned fertility	0.45	0.56
Premature Baby	0.05	0.03
Father present at birth	0.79	0.91
Labour was induced	0.31	0.33
Delivery using forceps	0.04	0.10
Delvery using vacuum	0.06	0.33
Epidural	0.20	0.34
Antenatal before week 12	0.40	0.47

Notes: Column 1 reports the average in the estimating sample and Column 2 reports the average amongst the compliers, computed using the methodology by Card, Fenizia, and Silver 2018. A socio-economic index (SES) is computed using a regression of income on the socio-economic variables reported in Tables 2 and Appendix Table B2. Higher SES implies that the mother's value of the index is above the median. (*) Although theoretically, all values should be between 0 and 1, in practice the methodology does not impose the constraint and hence it might be possible to observe values outside the range due to sample variability, especially when the true value is close to 0 or 1.

Source: Millennium Cohort Study.

TABLE F5 — EFFECT OF BREASTFEEDING ON PARENTING ACTIVITIES

Estimation Method ↓	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
		Age 3						
	Home Learning Environment Summary Index	Read to child every day	Take child to library once a week	Help child to learn alphabet every day	Teach child counting every day	Teach child songs/poems/ rhymes every day	Child paint/draw at home every day	Home Learning Environment
NTSLS	0.233	0.027	0.095	0.125	-0.181	0.231	0.096	3.233
	(0.228)	(0.173)	(0.076)	(0.146)	(0.173)	(0.175)	(0.172)	(2.735)
TSLS	-1.032	-0.527	0.106	-0.276	-1.022	-0.565	-0.911	-17.510
	(0.910)	(0.671)	(0.290)	(0.499)	(0.806)	(0.679)	(0.759)	(13.345)
OLS	0.089	0.067	0.017	0.017	0.01	0.047	0.007	1.014
	(0.025)	(0.019)	(0.010)	(0.015)	(0.019)	(0.019)	(0.019)	(0.298)
F statistic	6.922	5.162	5.162	5.162	5.162	5.162	5.162	5.162
P-value	0.009	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Mean	0.006	0.466	0.055	0.189	0.468	0.505	0.445	24.620
SD	0.682	0.499	0.227	0.392	0.499	0.500	0.497	7.833
Observations	5,062	4,487	4,487	4,487	4,487	4,487	4,487	4,487
		Age 5						
Estimation Method ↓		Read to child every day	Tell stories every day	Perform musical activities every day	Play physically active games every day	Play games/toys indoors every day	Child paint/draw at home every day	Home Learning Environment
NTSLS		0.046	-0.122	0.096	-0.034	-0.021	0.038	-1.685
		(0.185)	(0.123)	(0.179)	(0.095)	(0.159)	(0.103)	(2.635)
TSLS		0.375	0.140	0.685	-0.038	-0.394	0.346	0.868
		(0.549)	(0.350)	(0.580)	(0.277)	(0.468)	(0.331)	(7.403)
OLS		0.058	0.012	0.045	0.005	0.019	0.006	0.955
		(0.019)	(0.013)	(0.018)	(0.010)	(0.016)	(0.011)	(0.277)
F statistic		6.531	6.508	6.570	6.589	6.589	6.531	6.743
P-value		0.011	0.011	0.010	0.010	0.010	0.011	0.009
Mean		0.440	0.116	0.377	0.071	0.209	0.084	24.570
SD		0.496	0.320	0.485	0.257	0.406	0.278	7.289
Observations		4,399	4,398	4,398	4,398	4,398	4,399	4,395

Notes: Each cell reports coefficient of breastfeeding for at least 90 days from separate regressions in which the dependent variable is listed at the top of the column. Columns 2-7 are coded as 0/1 dummy variables; Column 1 is the Anderson Index computed using the dummy variables across all ages; Column 8, the Home learning environment, is the sum of the frequency of each of the activities reported in columns 2-7 (where 1="occasionally"...7="7 times per week/constantly", except in the case of library where 7="once a week"), taking a maximum value of 42. The estimation method is listed in the left hand column (NTSLS denotes non-linear two-stage least squares; TSLS denotes two-stage least squares; OLS denotes ordinary least squares). Control variables are those listed in Tables 2 and Appendix Table B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bankholiday (137 covariates in total), as well as hospital fixed effects. Exposure to weekend is excluded from the second-stage regressions. F statistic and P-value correspond to the null hypothesis that the coefficient on the excluded variable is zero, as estimated from an OLS regression where the dependent variable is breastfeeding for at least 90 days, and controls are as noted already. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Standard errors in parentheses.

Source: Millennium Cohort Study.

TABLE F6 — EFFECT OF BREASTFEEDING ON MATERNAL OUTCOMES

Estimation Method ↓	[1]	[2]	[3]	[4]	[5]	[6]
	Anderson (2008) Index for mother malaise	Mother's malaise index			Mother-child relationship	Mother-child conflict
		9 months old	3 years old	5 years old		
NTSLS	0.177	-0.191	-0.226	2.088	-3.16	-2.764
	(0.185)	(0.652)	(1.301)	(1.767)	(3.792)	(2.627)
TSLS	0.159	-0.215	-1.764	0.379	14.04	6.142
	(0.559)	(1.762)	(3.739)	(3.675)	(14.629)	(9.880)
OLS	0.026	-0.001	-0.069	-0.046	0.279	-0.525
	(0.020)	(0.060)	(0.161)	(0.158)	(0.381)	(0.267)
F statistic	8.636	7.694	7.385	7.219	4.764	4.764
P-value	0.003	0.006	0.007	0.007	0.029	0.029
Mean	0.012	1.739	3.533	3.472	29.03	14.54
SD	0.629	1.857	3.987	4.032	10.93	7.606
Observations	5,809	5,812	3,537	3,949	4,517	4,517

Notes: Each cell reports coefficient of breastfeeding for at least 90 days from separate regressions in which the dependent variable is listed at the top of the column. The dependent variable in column 1 is constructed from the malaise indices collected at 9 months, 3, 5, and 7 years. The age-specific malaise index at 9 months constructed from the 9-item Malaise Inventory, and the malaise indices at 3, and 5 years are constructed from the 6-scale Kessler Inventory. The estimation method is listed in the left hand column (NTSLS denotes non-linear two-stage least squares; TSLS denotes two-stage least squares; OLS denotes ordinary least squares). Control variables are those listed in Tables 2 and Appendix Table B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bank holiday (137 covariates in total), as well as hospital fixed effects. Exposure to weekend is excluded from the second-stage regressions. F statistic and P-value correspond to the null hypothesis that the coefficient on the excluded variable is zero, as estimated from an OLS regression where the dependent variable is breastfeeding for at least 90 days, and controls are as noted already. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Standard errors in parentheses.

Source: Millennium Cohort Study.

TABLE F7 — EFFECT OF BREASTFEEDING ON COGNITIVE INDEX: ROBUSTNESS

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
NTSLS	0.464	0.559	0.413	0.462	0.418	0.496	0.382
	(0.179)	(0.213)	(0.169)	(0.176)	(0.173)	(0.204)	(0.147)
First Stage F-statistic	7.023	3.307	8.284	6.906	7.095	7.023	7.023
Observations	5,015	3,482	5,588	5,015	5,015	5,015	5,015
[1] Include labour inductions	Y	N	Y	Y	Y	Y	Y
[2] Include emergency Caesarea	N	N	Y	N	N	N	N
[3] Control for polynomial in hour within the day (0-24)	N	N	N	Y	N	N	N
[4] Control for hour of birth dummies	N	N	N	N	Y	N	N
[5] Include imputed data	N	N	N	N	N	Y	N
[6] Reduced set of covariates	N	N	N	N	N	N	N
[7] Control for hospital fixed effe	Y	Y	Y	Y	Y	Y	N

Notes: Each cell reports coefficient of breastfeeding for at least 90 days from separate regressions in which the dependent variable is Cognitive Index and the estimation method is NTSLS (non-linear two-stage least squares). Control variables of columns 1-6 and 8 are those listed in Tables 2 and Appendix Table B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bank holiday (137 covariates in total). The reduced set of control variables in column 7 are a quadratic polynomial in child's age in months, child's gender, birth weight, labor induction, epidural as pain relief, attendance to antenatal classes, quadratic polynomial in mother's age, whether mother worked during pregnancy, family tax credits, income support, two education dummies (NVQ2 and NVQ missing but left school before age 17), own/access a car, and mother's ethnicity (5 dummies). Exposure to weekend is excluded from the second-stage regressions. F statistic and P-value correspond to the null hypothesis that the coefficient on the excluded variable is zero, as estimated from an OLS regression where the dependent variable is breastfeeding for at least 90 days, and controls are as noted already. Main sample contains low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Robustness exercise is indicated in the left hand column. Standard errors in parentheses.

Source: Millennium Cohort Study

TABLE F8 — EFFECT OF BREASTFEEDING ON CHILD DEVELOPMENT: CHANGING BREASTFEEDING DURATIONS

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Exposure to weekend				Polynomial in hour			
Index ↓	Was breastfed for at least 30 days	Was breastfed for at least 60 days	Was breastfed for at least 90 days	Was breastfed for at least 120 days	Was breastfed for at least 30 days	Was breastfed for at least 60 days	Was breastfed for at least 90 days	Was breastfed for at least 120 days
Cognitive Index	0.395	0.442	0.464	0.433	0.388	0.426	0.452	0.445
	(0.220)	(0.196)	(0.179)	(0.171)	(0.208)	(0.181)	(0.169)	(0.165)
Non-Cognitive Inde	0.395	0.399	0.319	0.291	0.424	0.417	0.344	0.321
	(0.266)	(0.241)	(0.224)	(0.213)	(0.254)	(0.225)	(0.213)	(0.207)
Health Index	-0.101	-0.014	0.009	0.086	-0.103	-0.037	-0.010	0.058
	(0.094)	(0.087)	(0.082)	(0.082)	(0.090)	(0.082)	(0.078)	(0.079)

Notes: Column 3 and 7 are the same as our main results (Table 5). The other columns replicate our main results but with other breastfeeding durations (as indicated in the column heading). Estimation method is NTSLS (non-linear two-stage least squares). Control variables are those listed in Tables 2 and Appendix Table B2 (including a cubic polynomial in child's age, quadratic polynomial on mother's age and a dummy variable if highest qualification is missing but left school before age 17), month of birth dummies, interview month dummies, country dummies, and whether the baby was born on a bankholiday (137 covariates in total), as well as hospital fixed effects. Exposure to weekend [cubic polynomial in hour] is excluded from the second-stage regressions. F statistic and P-value correspond to the null hypothesis that the coefficient(s) of the excluded variable(s) are zero or jointly zero, as estimated from an OLS regression where the dependent variable is indicated in the column heading, and controls are as noted already. Sample comprises low educated mothers (NVQ level 2 or less, or NVQ level unknown but left school before 17), and excludes children born through caesarean sections (either emergency or planned) and children placed in intensive care after delivery. Standard errors in parentheses.

Source: Millennium Cohort Study.