Does the Month of Birth affect Educational Success Later in Life?

An analysis based on Northern Ireland Longitudinal Study (NILS)-Data.

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Background & Literature

There is an array of literature on the effects of the month of birth on educational and labour market outcomes in later life.

Key Problem: Because all children born before a certain cut-off date of a school-year are included in the same class, some children are almost a year younger than some of their classmates.

Research Question: Does the Month of Birth affect educational success later in life? Are students born closer before the cut-off date educationally disadvantaged?

Background & Literature

For England and Wales, there is evidence that those born in July and August have poorer educational and labor market outcomes (Crawford, Dearden, and Meghir 2010; Crawford, Dearden, and Meghir 2007; Sprietsma 2010; Black, Devereux, and Salvanes 2010) than those born later in the year.

In England & Wales the school year starts on 1st September.

In Northern Ireland, children born before 30th June are included in the first class of a school year. The school year starts on 1st July.

In the USA it has been suggested that those with winter births experience poorer later outcomes (Buckles et al 2010).

Motivation:

- The earlier start of the Northern Ireland school year permits a quasi-natural experiment in which Northern Ireland can be contrasted with England & Wales and the robustness of birth month effects to be assessed.

- The NILS, with its large sample size (N = c. 500,000) is an excellent data source to analyze even relatively small groups (pupils by birth-months).

- Also, the longitudinal design of the NILS allows to look at outcomes later in life.

Caveats:

The school-starting age in Northern Ireland (4 years) differs from England and Wales (5 years). This impairs the comparability of our data with the English and Welsh data.

The literature on England and Wales, and also the majority of studies from the US use educational data (data on test-scores controlling for cognitive ability). Results based on the NILS are not directly comparable to these data.

Intervals between waves: ten years is a long interval. A lot can happen between 2001 and 2011 that we cannot account for.

But Strength: Educational success later in life ('having a degree') is comparable to the abovementioned studies. The NILS offers a large sample to examine this.

Data & Methods

- **Data:** The Northern Ireland Longitudinal Study (NILS) with Census link for 2001 and 2011.
- **Sample:** all NILS-Members aged 12 to 18 in 2001, and 22 to 28 in 2011.
- Thus in 2001 the respondents are of school-age and living with their parents, and in 2011 can have obtained a degree.
- **N= 36,087**

- **Methods:** bivariate statistics, hierarchical linear & binary logistic Multilevel Modeling

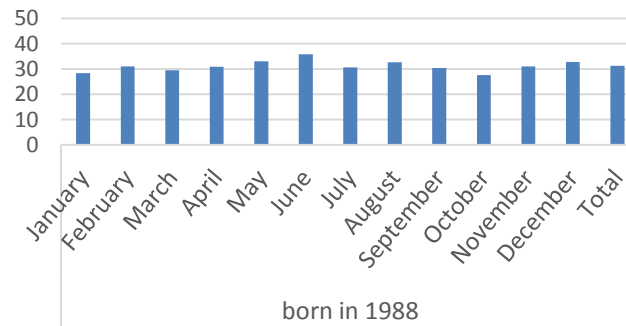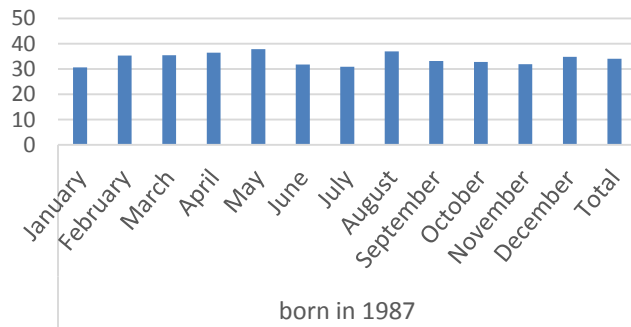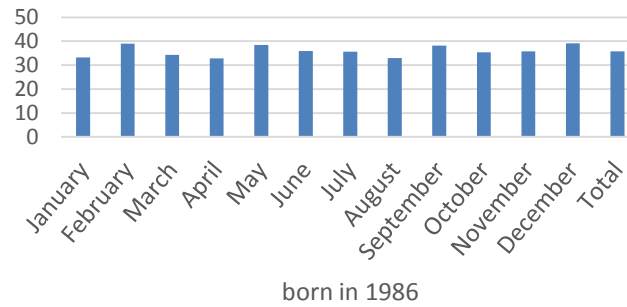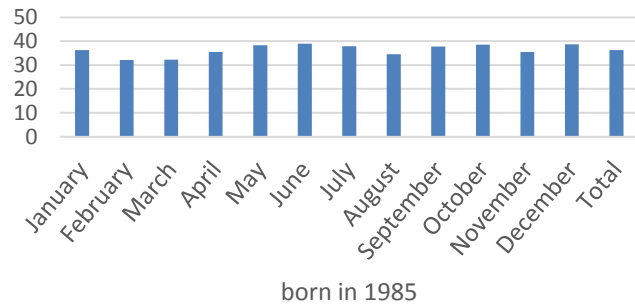- **Response:** 'Having a Degree in 2011' (binary logistic regression)

The Sample:

Birthmonth	N	Percent
January	3,117	8.64
February	2,754	7.63
March	3,249	9.00
April	2,810	7.79
May	3,221	8.93
June	3,306	9.16
July	2,875	7.97
August	3,250	9.01
September	3,170	8.78
October	2,999	8.31
November	2,679	7.42
December	2,657	7.36
Total	36,087	100

Findings:

% having a university degree
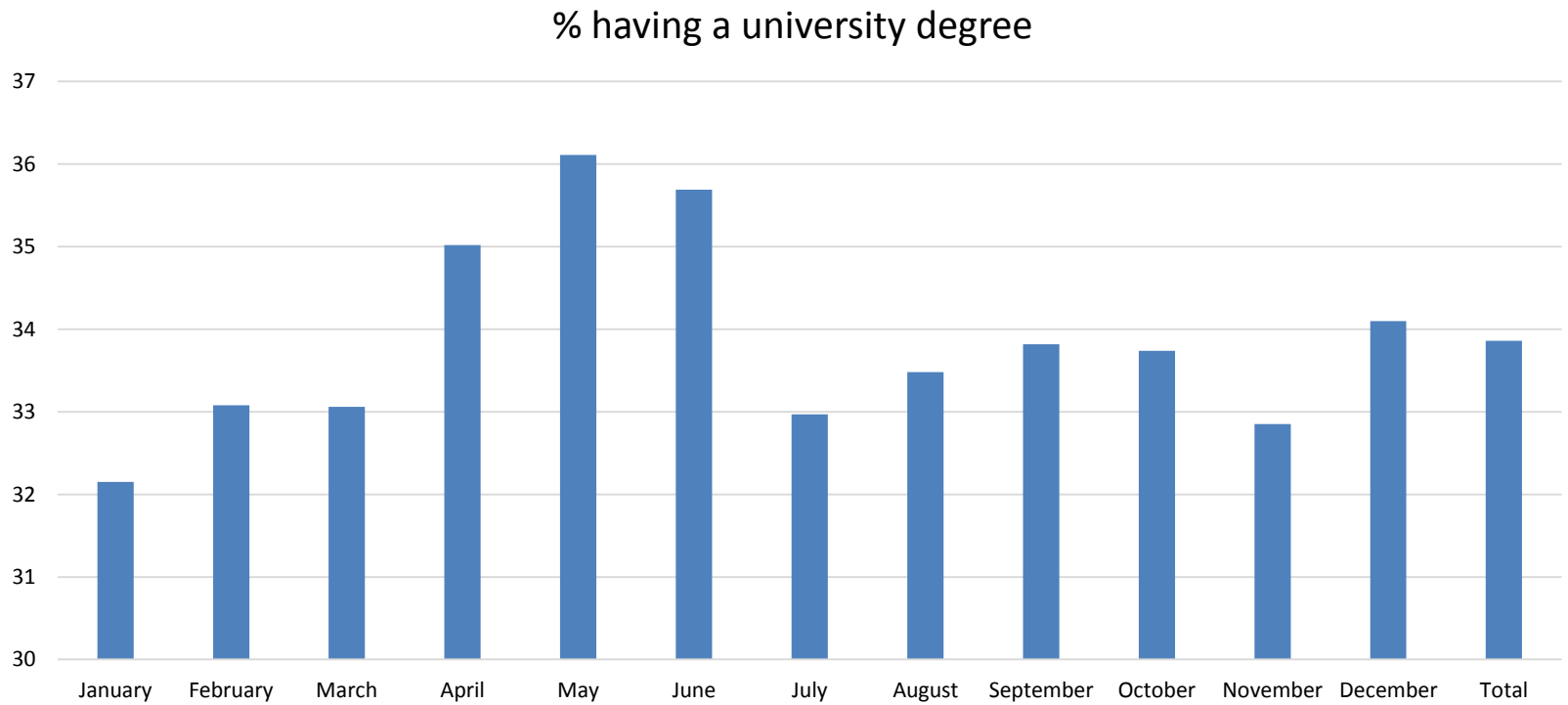
Percent of Respondents Who have a University Degree by Birth-month and Year

born in 1983

born in 1984

born in 1985

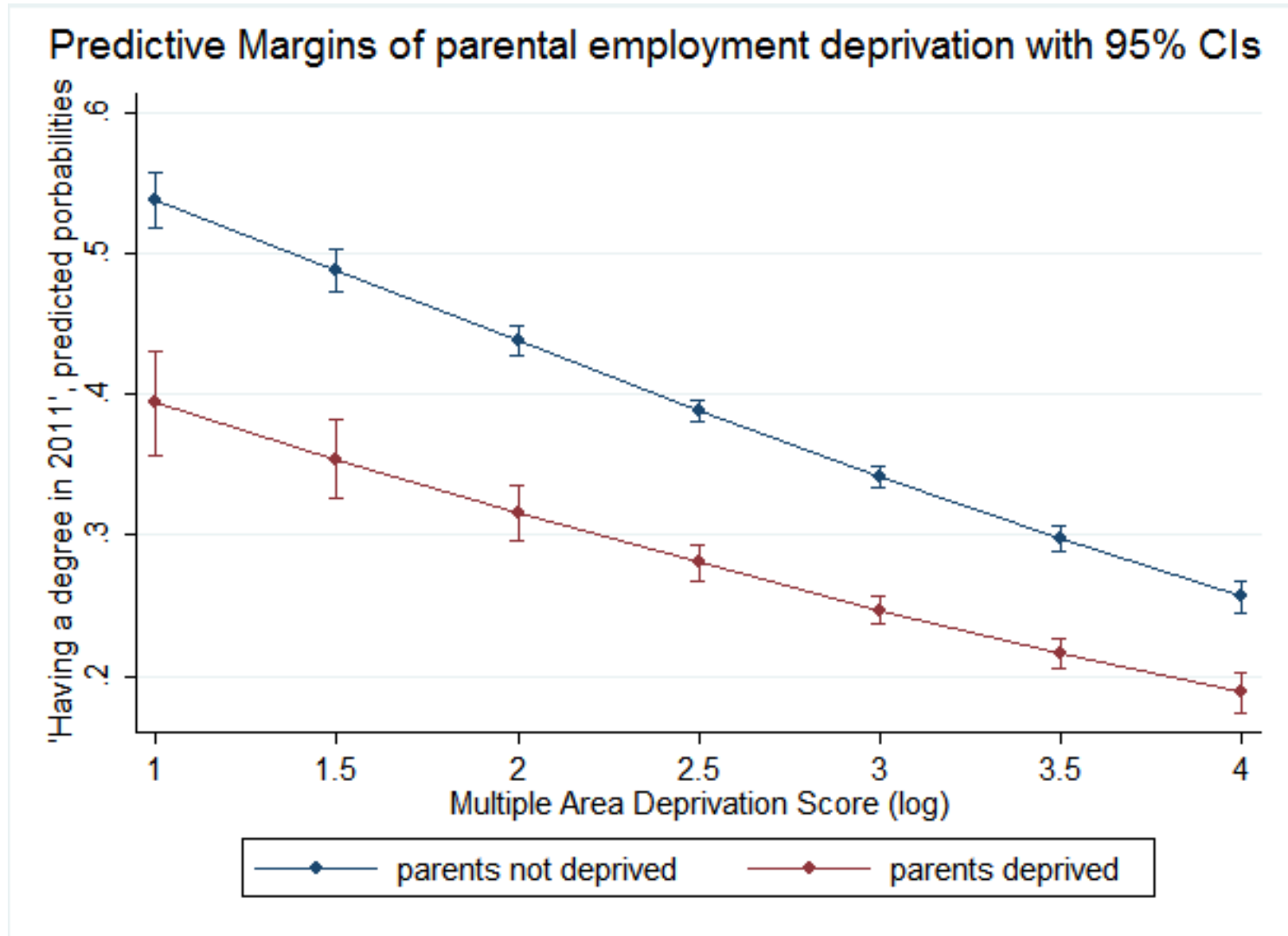born in 1986

born in 1987

born in 1988
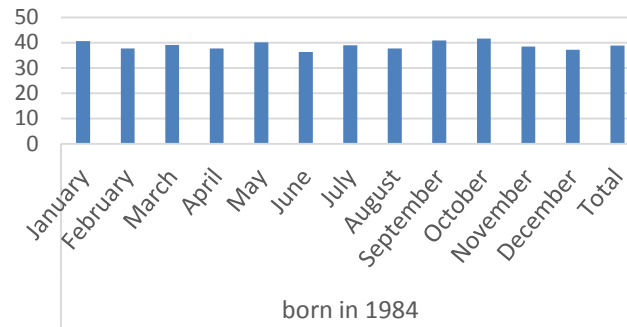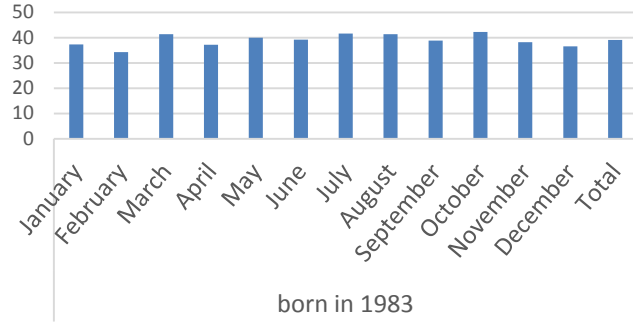
Binary Logistic Multilevel Model: 'Having a Degree in 2011' on Month of Birth and Controls

	M1 Coef.	S.E.	M2 Coef.	S.E.	M3 Coef.	S.E.
Fixed Part						
January	-0.099	0.058	-0.082	0.06	-0.079	0.06
February	-0.063	0.06	-0.051	0.061	-0.04	0.061
March	-0.069	0.057	-0.063	0.059	-0.056	0.059
April	0.01	0.059	0.051	0.061	0.053	0.061
May	0.072	0.057	0.109	0.059	0.111	0.059
June	0.064	0.057	0.096	0.059	0.099	0.058
July	-0.086	0.059	-0.064	0.061	-0.062	0.061
August	-0.038	0.057	-0.022	0.059	-0.013	0.059
September	-0.032	0.058	-0.003	0.059	-0.002	0.059
October	-0.028	0.058	0.007	0.06	0.016	0.06
November	-0.09	0.06	-0.08	0.062	-0.069	0.062
Sex: female			0.626***	0.024	0.631***	0.024
Age			0.090***	0.006	0.091***	0.006
Parents divorced/separated			-0.613***	0.036	-0.560***	0.036
House-owner			0.310***	0.031	0.312***	0.031
Parental Deprivation: Education			-0.764***	0.034	-0.729***	0.033
Parental Deprivation: Employment			-0.557***	0.03	-0.489***	0.030
Area: Multiple Deprivation Score					-0.421***	0.021
Constant	-0.677***	0.046	-3.590***	0.169	-2.466***	0.175
Level2-Variance	0.529***	0.046	0.403**	0.047	0.266***	0.069
N	36087		36087		36087	

Some Cross-Level Interactions:

Predictive Margins of Parental Educational Deprivation with 95% CIs

Some Cross-Level Interactions:

Predictive Margins of parental employment deprivation with 95% CIs
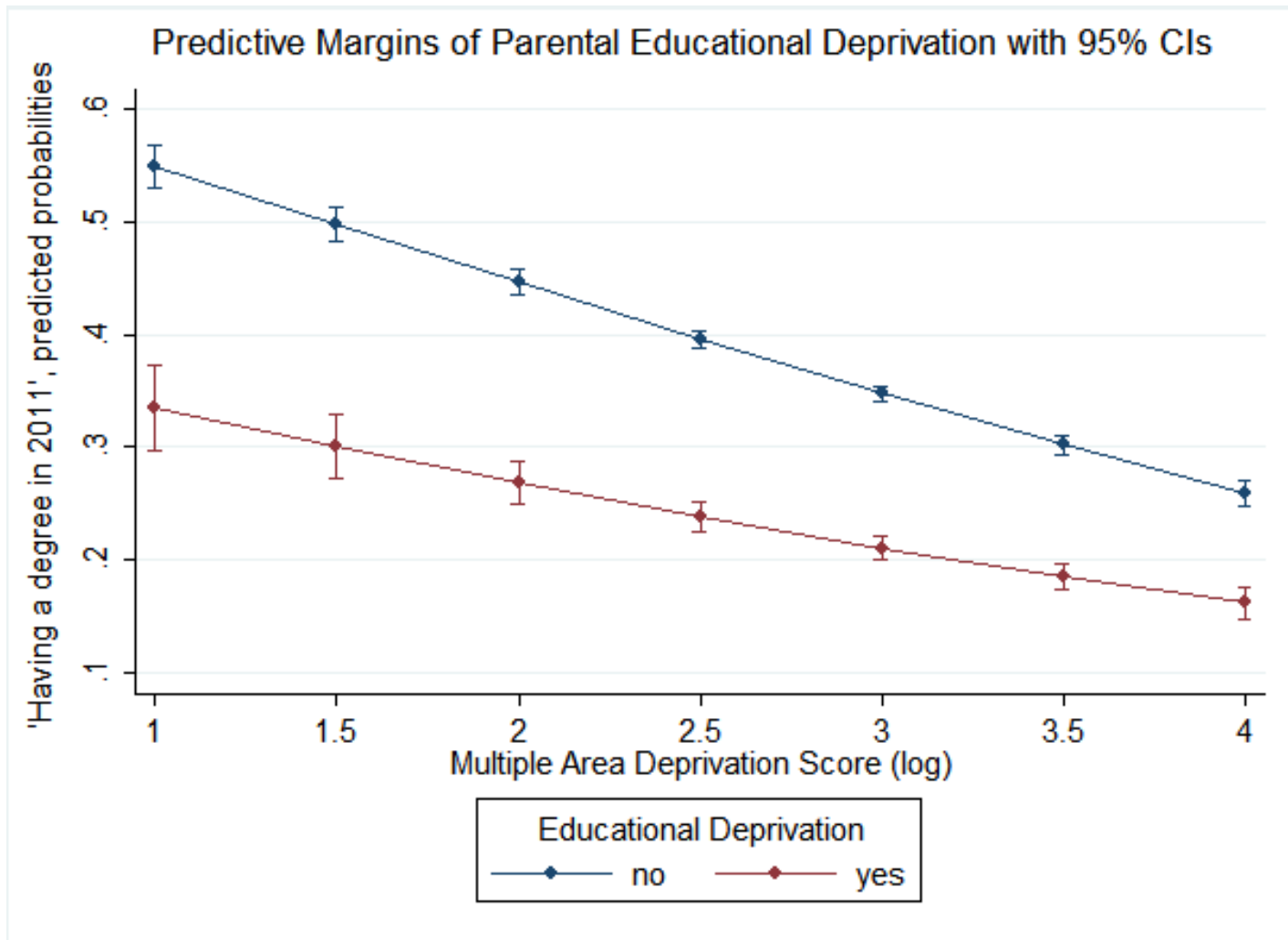
Some Cross-Level Interactions:

Predictive Margins of houseowner with 95% CIs
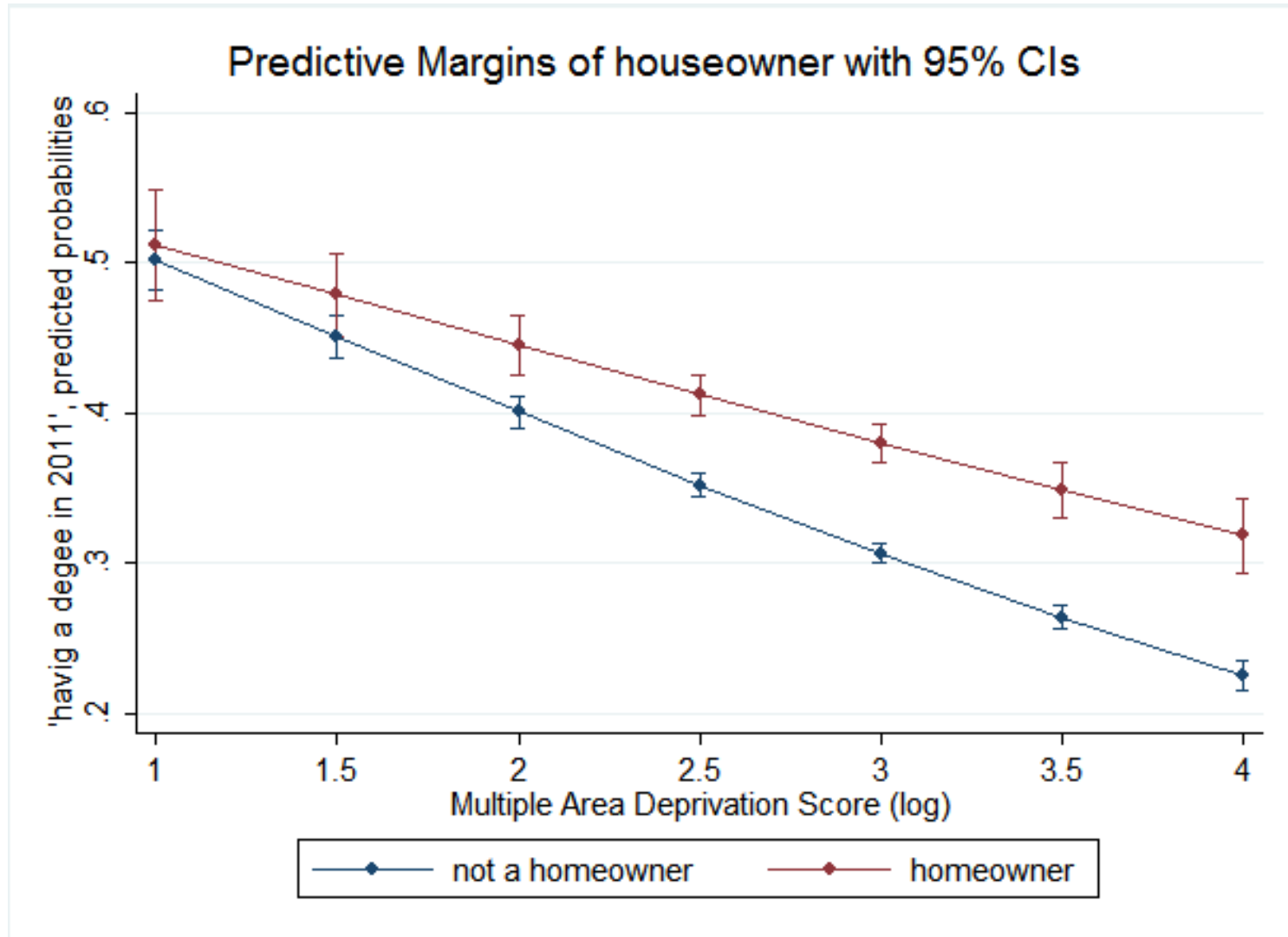
Self-Reported Health: Hierarchical Linear Model

DV: Self-Reported Health in 2011	M1		M5		M6	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
January	-0.024	0.019	-0.026	0.018	-0.026	0.018
February	-0.025	0.019	-0.027	0.019	-0.027	0.019
March	-0.015	0.018	-0.009	0.018	-0.009	0.018
April	-0.013	0.019	0.003	0.019	0.003	0.019
May	-0.006	0.018	-0.004	0.018	-0.004	0.018
June	-0.026	0.018	-0.03	0.018	-0.03	0.018
July	0.002	0.019	0.001	0.019	0.001	0.019
August	-0.028	0.018	-0.028	0.018	-0.028	0.018
September	-0.004	0.019	-0.004	0.018	-0.004	0.018
October	-0.028	0.019	-0.031	0.019	-0.031	0.019
November	-0.007	0.019	-0.007	0.019	-0.007	0.019
SEXP1			0.050***	0.007	0.050***	0.007
AGEP1			0.021***	0.002	0.021***	0.002
divorced			0.110***	0.01	0.109***	0.01
houseowner			-0.081***	0.01	0.01	0.042
Parental Deprivation: Education			0.090***	0.009	0.089***	0.009
Parental Deprivation: Employment			0.121***	0.009	0.121***	0.009
MDM-Score (log-transformed)			0.056***	0.006	0.060***	0.006
Interaction: Divorced * MDM-Score					0.030*	0.013
Interaction: Parents own house * MDM-score				0.004	-0.033*	0.054
Constant	1.512***	0.014	0.694***	0.0014	0.682***	
Sigma u	-2.297***	0.053	-2.883***		-2.893***	
Sigme e	-0.366***	0.004	-0.373***		-0.373***	
N	35525		35525		35525	
ICC	0.020575		0.00657		0.0060	

Cross-Level Interaction:

Predictive Margins of Divorced/separated with 95% CIs
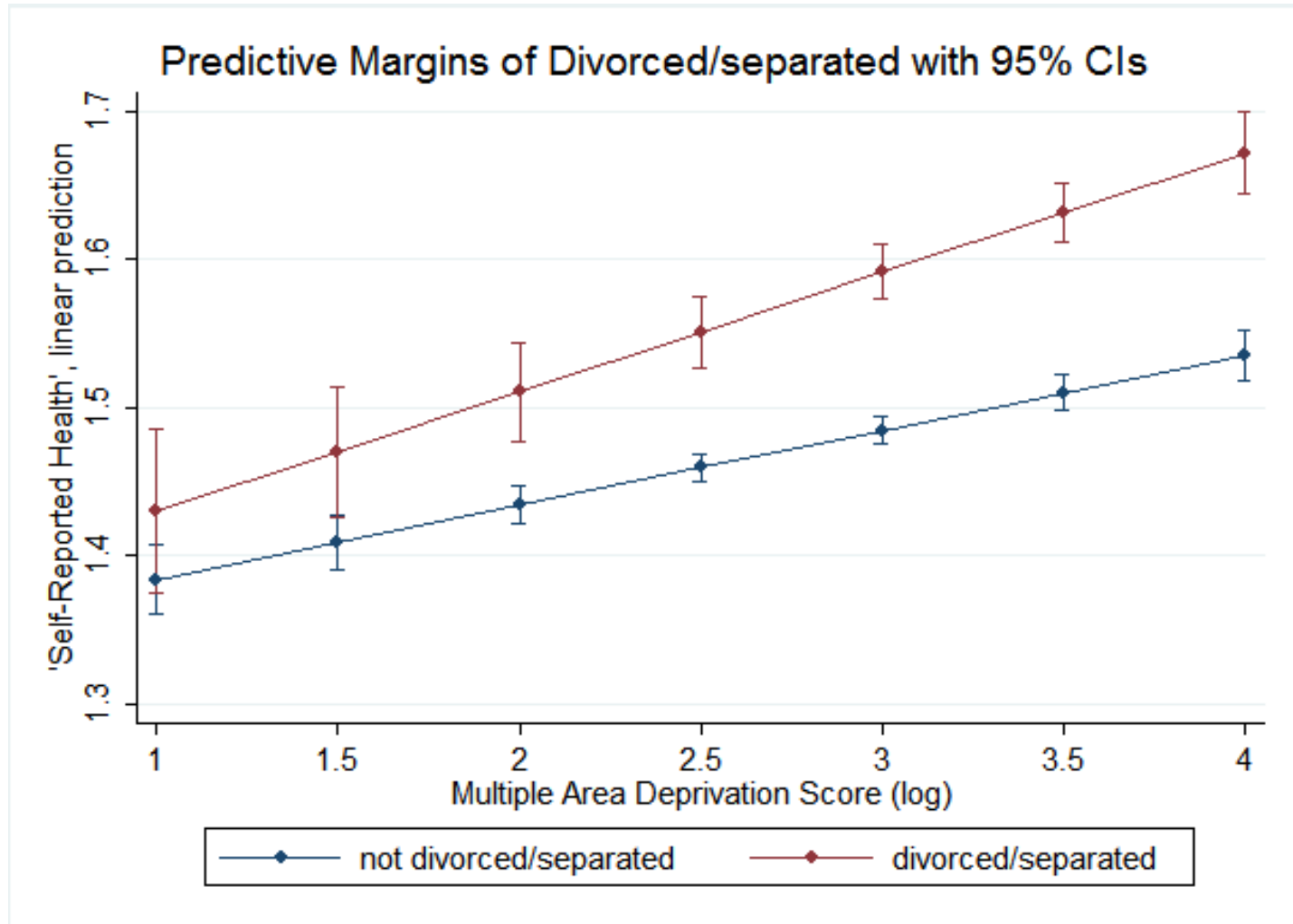
-> The Month of Birth is not statistically related to self-reported health

-> parental deprivation, unstable families (divorce) and area-deprivation are strongly related to young people's decreased health.

Conclusions

- In Northern Ireland the month of birth does not have a (substantially or statistically) significant effect on the likelihood of having obtained a degree later in life.
- Thus, our data do not confirm the hypothesis of a long-term educational disadvantage.

- The same analysis was carried out for 'having obtained A-levels', with the same result.

- What matters for tertiary educational outcomes are parental (material, educational and employment) deprivation, having separated/divorced parents, and area-deprivation.

- Future analyses should focus on these factors.

Acknowledgement

NILS-RSU Contact Details:
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References

Black, Sandra E., Paul J. Devereux, and Kjell G. Salvanes. 2010. "Too Young to Leave the Nest? The Effects of School Starting Age." *Review of Economics and Statistics* 93 (2) (August 5): 455–467. doi:10.1162/REST_a_00081.

Crawford, Claire, Lorraine Dearden, and Costas Meghir. 2007. *When You Are Born Matters. The Impact of Date of Birth on Child Cognitive Outcomes in England*. London: Centre for the Economics of Education, London School of Economics.

———. 2010. "When You Are Born Matters: The Impact of Date of Birth on Educational Outcomes in England". 10,06. IFS working papers. http://www.econstor.eu/handle/10419/47462.

Sprietsma, Maresa. 2010. "Effect of Relative Age in the First Grade of Primary School on Long-term Scholastic Results: International Comparative Evidence Using PISA 2003." *Education Economics* 18 (1): 1–32. doi:10.1080/09645290802201961.