The emergence of health gaps in early life in France: Effects of childhood deprivation

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Motivation I

- Inequalities in health begin from the starting gate and children's early environment "get under the skin" from birth (Currie et al., 2007; Irwin et al., 2007). Children of poor or less educated parents tend to have worse health outcomes on average than other children, even in reach counties (Currie, 2009).

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- ***Health gaps or health inequality*** means that there is a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage:

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  → How to measure "socio-economic status" to describe health gaps in childhood?

- **_Income poverty_** assumes that household income is a reliable guide to resources available to children:
  → HH income does not fully capture the full extent of children's lived experience of disadvantage, family composition, and the prioritization of resources over the needs of children;
  → Poverty is about more than just the inability to meet basic needs, e.g., people also value ability to participate in social activities.

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- *Multidimensional deprivation* as a tool to better understand childhood disadvantage.

- We use a child-centred, life-course, multidimensional framework for a better understanding of the emergence of socioeconomic health inequalities in early childhood:
  - → How are multidimesional deprivation and its different dimensions linked to early health?
  - → Does the depth of deprivation and accumulation of deprivation play a significant role?

Motivation II

- French healthcare system has been globally recognized for its overall quality:
  → France is one of largest healthcare spenders: 11.2% of its GDP vs an average of 8.8% in OECD countries (OECD, 2019);
  → A high level of public support for expenses: direct out-of-pocket spending for patients is the lowest in the OECD at 9% vs 21% on average (OECD, 2019);
  → 99.9% of population is covered with a core set of healthcare services;
  → One of the highest life expectancies in the world – 82.9 years in 2018 (OECD, 2020);

- But, health inequality remains high: there is a 13-year gap in life expectancy at birth for men between the wealthiest and poorest 5% of the population (INSEE, 2018);

- The reduction of health inequalities is at the top of a healthcare policy framework outlined in the French National Health Strategy (Ministère des solidarités et de la santé, 2017).

Data

- ***Etude Longitudinale Française depuis l'Enfance (Elfe):***
  - → France's first large scale cohort study, following approximately 18,000 children born in 2011 at a representative sample of 344 French hospitals;
  - → A multidisciplinary approach (child development and health, socio-economic context, environmental exposures);
  - → Data collected shortly after birth in hospital; then phone interviews at 2 months, 1, 2, 3.5, 5.5 years.

- ***Sample:***
  - → Five survey waves from 2 months to 5.5 years -> 68,314 productive interviews.
  - → Analytical sample: all households that do not have missing information on the items used in construction of multi-dimensional childhood deprivation -> 58,812 child-year observations.

Multidimensional deprivation index: construction

- Based on counting methods to measure adult multidimensional poverty (Alkire and Foster, 2009);

- Modifications:
  - → Conceptualisation of deprivation as child-centred;
  - → Longitudinal measures that are comparable but adapt over time to account for children's changing needs.

- Our approach:
  - → Identify potential items that may measure child-centred deprivation (!data availability);
  - → Apply multiple component analysis to explore which clusters of variables emerge and identify discrete dimensions of deprivation that are important for children in early childhood:
    - – Dimensions of deprivation stay constant over time;
    - – Each dimension consists of indicators which signal a lack of specific age-relevant good or activities;
    - – The indicators making up each dimension are a mix of stable and changing variables that reflect children's needs at different age.
  - → Apply a double-counting approach to identify if a child is deprived or not (1) across dimensions and (2) overall.

Multidimensional deprivation index: dimensions

Five dimensions:

→ *Material deprivation* captures the living conditions of the household and means the inability to afford some basic items considered by most people to be desirable or even necessary to lead an adequate life;

→ *Housing deprivation* is a measure of poor housing amenities: difficulty to heat the home, problems with damp, mold and noise, and whether the child has a private/shared room;

→ *Extreme living conditions deprivation* is a measure of extremely poor amenities: no hot water, no bathroom, no toilets, living in temporary housing such as a caravan;

→ *Parenting deprivation* reflects parents' involvement in childrearing and enriching activities (shared reading, playing with the child etc.);

→ *Health behaviours deprivation* considers nutrition, enough sleep, physical activity and sedentary behaviour.

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> **A child is classed as multidimensionally deprived if deprived in at least two dimensions.**

Multidimensional deprivation: descriptive statistics

Table 1 - Share of deprived and income poor children

	2m	1y	2y	3.5y	5.5y	Total
Multidimensionally deprived	14.9	12.3	12.8	11.1	9.7	12.1
Income poor	16.6	17.1	15.7	14.8	14.1	15.6
% of income poor among deprived	42.6	45.3	39.5	38.0	31.4	39.6
% of income poor among non-deprived	12.1	13.7	12.5	11.8	12.3	12.5
Deprived & Income poor	6.2	4.8	4.8	4.3	3.0	4.6
N	12,736	12,837	11,379	10,230	10,003	57,185

Empirical approach

Logistic regression models:

Health outcome$_i$ = α*Deprivation$_i$ + Controls$_i$ + ζ$_i$

Health outcomes: General health: "good health" vs "less than good health";

Probability to be overweight: based on child's weight-for-length or BMI;

Wheezing: at least one episode of chest wheezing in the last 12 months;

Unintentional injury: injury required contact with medical services in the last 12 months (cranial trauma, burns, wound, ingestion of medical or cleaning products, contusion, fractured limb, etc.)

Deprivation: overall deprivation or its different dimensions; the most frequent combinations of deprivation dimension; depth of deprivation; accumulation of deprivation.

Controls: child's gender and age in months, highest educational level in household, household migration status, family structure, household employment status, number of siblings, birth weight (low or high), maternal smoking during pregnancy, childcare/school attendance, region of residence, year/season of interview.

Child health outcomes

Table 2 - Share of children with health issues, by deprivation status

	General health – not good		Overweight		Wheezing		Injury	
	Deprived	Not deprived	Deprived	Not deprived	Deprived	Not deprived	Deprived	Not deprived
2 months	13.2	12.4	**4.6**	**3.0**	**9.9**	**5.4**	0.7	0.2
1 year	16.9	18.8	**7.7**	**3.8**	26.0	27.0	3.6	3.6
2 years	**16.5**	**13.0**	n/a	n/a	**16.7**	**19.4**	12.0	9.8
3.5 years	n/a	n/a	**7.7**	**4.5**	17.1	15.3	**13.6**	**10.8**
5.5 years	**28.7**	**19.8**	5.0	3.4	**16.1**	**12.0**	13.0	13.1
Total	**18.1**	**16.2**	**6.1**	**3.7**	**17.1**	**16.1**	8.1	7.7
N total	46,950		40,173		57,163		57,184	

Deprivation and early health

Table 3 – Odds ratio of deprivation and its different dimensions on health outcomes, pooled logit estimation

	Health outcome			
	General health	**Overweight**	**Wheezing**	**Injury**
Model 1				
Multidimensional deprivation	**1.164*****	**1.250*****	1.049	**1.145*****
	(0.037)	(0.063)	(0.040)	(0.052)
Controls:				
Time and region	Yes	Yes	Yes	Yes
Individual and family characteristics	Yes	Yes	Yes	Yes
N	46,933	40,113	57,155	57,173

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Model 2				
Material deprivation	**1.160*****	0.941	1.028	1.045
	(0.050)	(0.072)	(0.053)	(0.068)
Housing deprivation	**1.213*****	**1.342*****	**1.069***	**1.116****
	(0.038)	(0.074)	(0.041)	(0.053)
Extreme living conditions deprivation	0.992	1.209	**1.238*****	1.070
	(0.067)	(0.164)	(0.089)	(0.113)
Parenting deprivation	1.079	**1.310*****	**0.869****	**1.122***
	(0.054)	(0.100)	(0.048)	(0.070)
Health behaviours deprivation	1.033	**1.184*****	**0.964***	0.962
	(0.021)	(0.052)	(0.019)	(0.024)
Controls:				
Time and region	Yes	Yes	Yes	Yes
Individual and family characteristics	Yes	Yes	Yes	Yes
N	46,933	40,113	57,155	57,173

Depth of deprivation and early health

Distribution of children by the depth of deprivation

Not deprived – 43.1%
Deprived in 1 dimension – 44.8%
Deprived in 2 dimensions – 10.3%
Deprived in 3 and more dimensions – 1.8%

Depth of deprivation and early health

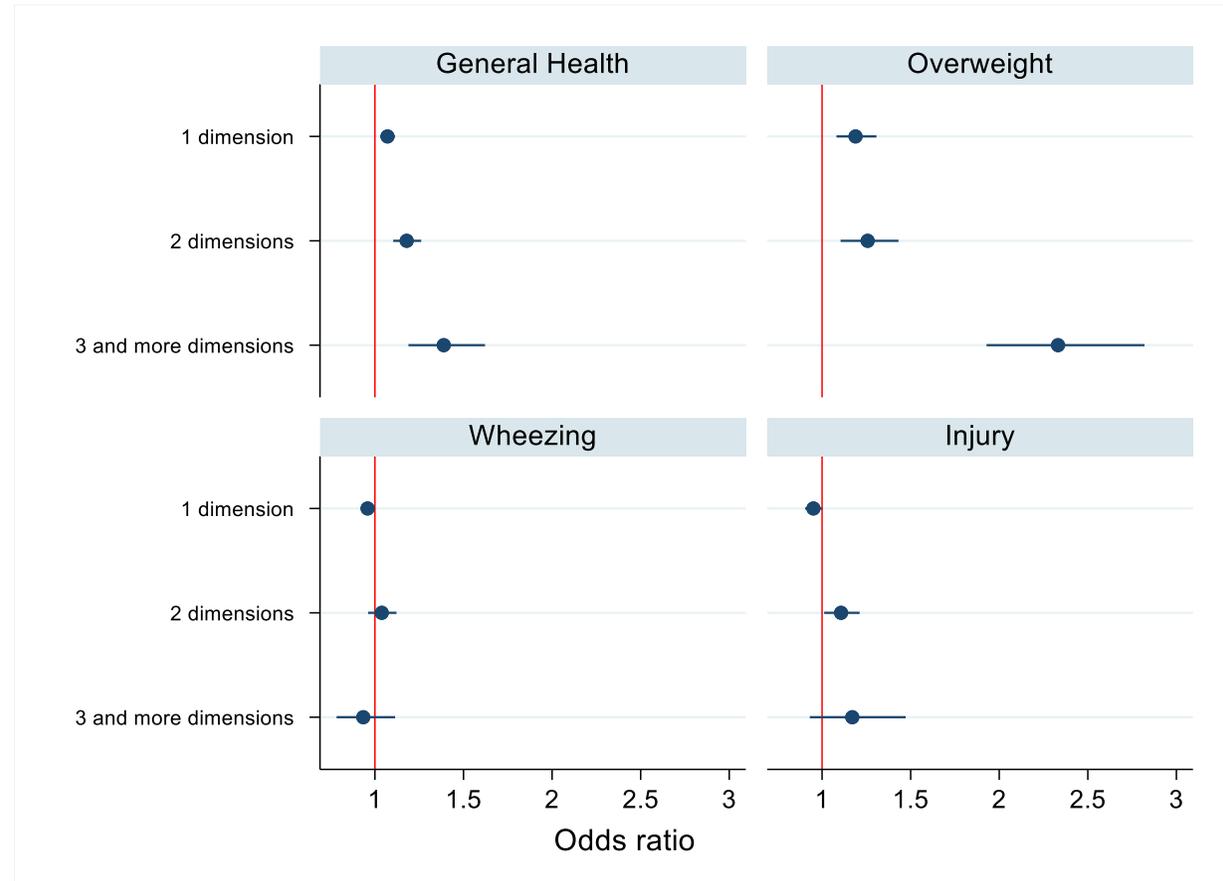***Distribution of children by the depth of deprivation***

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Figure 1 – Odds ratio of depth of deprivation on health outcomes (base – not deprived)

Deprivation accumulation and early health

Number of times being deprived by age 5.5 years (complete sample)

Never been deprived – 75.2%
Once over 5 years – 14.6%
Twice over 5 years – 5.5%
Three-five times over 5 years – 4.7%

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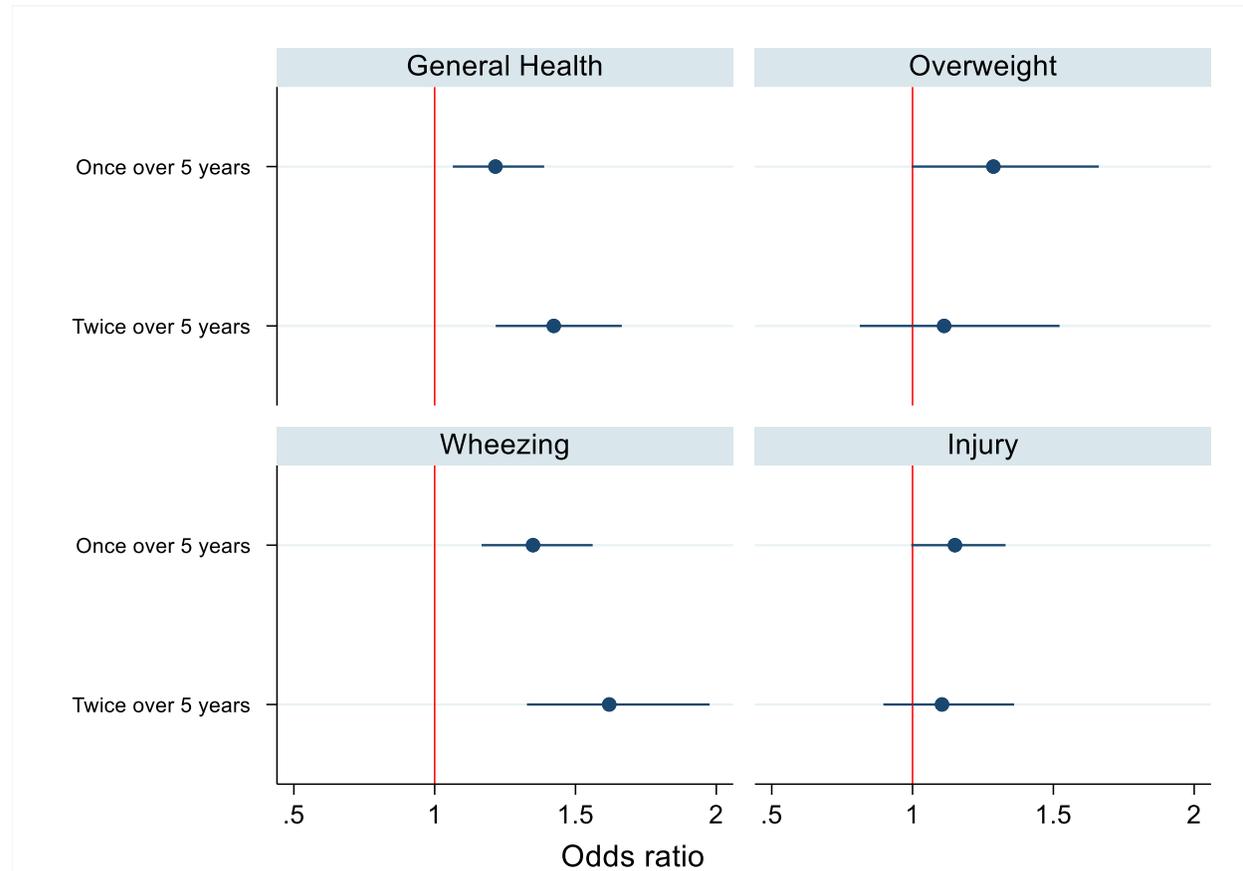Once over 5 years – 14.6%
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Three-five times over 5 years – 4.7%

Figure 2 – Odds ration of deprivation accumulation by age 5.5 years (base – never been deprived)

Conclusion

- Around 12% of children are identified as multidimensionally deprived during their early childhood in the nationally-representative sample of children born in France in 2011;

- Children with parents with low education, with a migrant background, without employment, as well as children from single-parent households, have a higher chance of being deprived. Children from these groups are 2-4 times more likely to be deprived;

- Deprived children have poorer general health, are more likely to be overweight, and are more likely to report unintentional injury;

- Different dimensions matter for different health outcomes;

- Both depth and accumulation of deprivation matter for general health, while it is only depth of deprivation for the probability to be overweight and accumulation of deprivation over time for wheezing.

Thank you!

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Multidimensional deprivation index: dimensions (2)

Material deprivation: inverse-frequency weights; cut-off = 25% of weighted indicators

	2m	1y	2y	3.5y	5.5y	Cut-off
Affordability of new clothes	5.3	-	-	-	-	Cannot afford it
Affordability of 2 pairs of shoes per adult	5.2	-	-	-	-	Cannot afford it
Affordability of meat/fish every two days	4.7	-	-	-	-	Cannot afford it
Lack of at least 1 meal per day	2.9	-	-	-	-	Yes
Being able to pay bills on time	9.1	-	-	-	7.3	Cannot afford it
Affordability of replacing furniture	18.0	-	-	-	-	Cannot afford it
Affordability of one week of holidays per year	20.2	-	-	21.9	15.0	Cannot afford it
Affordability of inviting friends/family at least once a month	5.0	-	-	-	-	Cannot afford it
Affordability of presents to friends/family at least once a year	5.5	-	-	-	-	Cannot afford it
Wi-Fi/Internet at home	-	2.4	3.3	2.0	1.5	No
Toys	-	3.8	3.4	-	4.4	No
Birthday celebration	-	61.9	20.0	-	32.2	No
Sport clubs	-	-	-	82.8	37.6	No
% of deprived in this dimension	**9.0**	**6.1**	**7.3**	**2.3**	**4.1**	

Multidimensional deprivation index: dimensions (3)

Housing deprivation: equal weights; cut-off = 25% of weighted indicators

	2m	1y	2y	3.5y	5.5y	Cut-off
Difficult to heat the house	19.6	19.6	17.2	15.5	14.5	Yes
Damp in the house	8.5	8.5	6.8	5.6	5.2	Yes
Mould in the house	6.8	6.4	5.4	4.5	4.1	Yes
Noisy in the house	12.1	11.8	9.8	8.6	8.3	Yes
Private/shared with siblings room	36.0	19.5	10.7	5.6	1.9	No
% of deprived in this dimension	**20.9**	**15.5**	**11.9**	**9.5**	**9.3**	

Extreme living conditions: equal weights; cut-off = 25% of weighted indicators

	2m	1y	2y	3.5y	5.5y	Cut-off
Hot water in the house	1.2	1.1	0.7	0.5	0.4	No
Bathroom in the house	0.4	0.5	0.5	0.4	0.3	No
Toilets in the house	0.4	0.6	0.3	0.2	0.1	No
Extreme type of dwelling	1.0	0.7	0.7	0.5	0.4	Yes
% of deprived in this dimension	**2.9**	**2.3**	**2.0**	**1.4**	**1.0**	

Multidimensional deprivation index: dimensions (4)

Parental deprivation: inverse-frequency weights; cut-off = 25% of weighted indicators

	2m	1y	2y	3.5y	5.5y	Cut-off
Singing songs to the child	8.2	6.0	-	2.1	5.3	Rarely (W1,2)/ No (W4,5)
Talking to the child	1.5	2.9	-	2.0	1.9	Sometimes/Rarely (W1) Rarely (W2) / Less than once a week (W4,5)
Skin to skin contact with the child	35.2	1.3	-	-	-	No (W1) /Sometimes/Rarely (W2)
Playing with the child	-	1.7	5.2	-	-	Rarely (W2) Sometimes/Rarely (W3) No (W4,5)
Reading book to the child	-	22.5	-	2.4	3.6	Rarely (W2) / No (W4,5)
Physical activities with the child	-	-	24.4	-	12.6	Sometimes/Rarely
Drawing with the child	-	64.5	-	2.7	3.2	No
Teaching the child counting, writing, reading, etc.	-	-	-	9.7	4.3	No
% of deprived in this dimension	**1.5**	**3.8**	**5.4**	**4.2**	**4.2**	

Multidimensional deprivation index: dimensions (5)

Health deprivation: equal weights; cut-off = 25% of weighted indicators

	2m	1y	2y	3.5y	5.5y	Cut-off
Nutrition	49.9	17.3	21.6	20.5	12.9	Unhealthy eating
Sleep time	-	6.1	2.6	3.2	5.2	Less than recom. time
Sedentary behaviour - Screen time	-	23.5	28.3	47.7	40.7	More than recom. time
Physical activity	-	-	5.2	5.1	3.2	Sometimes/Rarely
% of deprived in this dimension	**49.9**	**38.6**	**45.8**	**60.7**	**51.7**	

Multidimensional deprivation

Share of multidimensionally deprived children
*Equal weights; cut-off = 40% of weighted indicators = deprived at least in 2 dimensions*

	2m	1y	2y	3.5y	5.5y
Material deprivation	9.0	6.1	7.3	2.3	4.1
Housing deprivation	20.9	15.5	11.9	9.5	8.3
Extreme living conditions	2.9	2.3	2.0	1.4	1.0
Parenting deprivation	1.5	3.8	5.4	4.2	4.2
Health behaviour deprivation	49.9	38.6	45.8	60.7	51.7
Multidimensionally deprived	**14.9**	**12.3**	**12.8**	**11.1**	**9.7**

Who is deprived?

Children with:

- Low educated parents:
  - → among deprived children, significantly more low educated mothers (27% vs 9%) and fathers (25% vs 9%) and significantly less high educated mothers (25% vs 56%) and fathers (25% vs 48%);

- Parents with a migrant background:
  - → among deprived children, significantly more mothers with a migrant background (26% vs 13%) and fathers with a migrant background (10% vs 4%);

- Parents who are not employed:
  - → among deprived children, significantly more mothers who do not work (57% vs 28%) and fathers who do not work (28% vs 11%);
  - → with child's age, the shares of employed mothers and fathers grow both among deprived and not deprived children;

- Single-parent families:
  - → among deprived children, significantly more single-parent families (20% vs 6%);

- More siblings:
  - → among deprived children, significantly more children with two and more siblings (35% vs 24%).

Risk of deprivation and income poverty
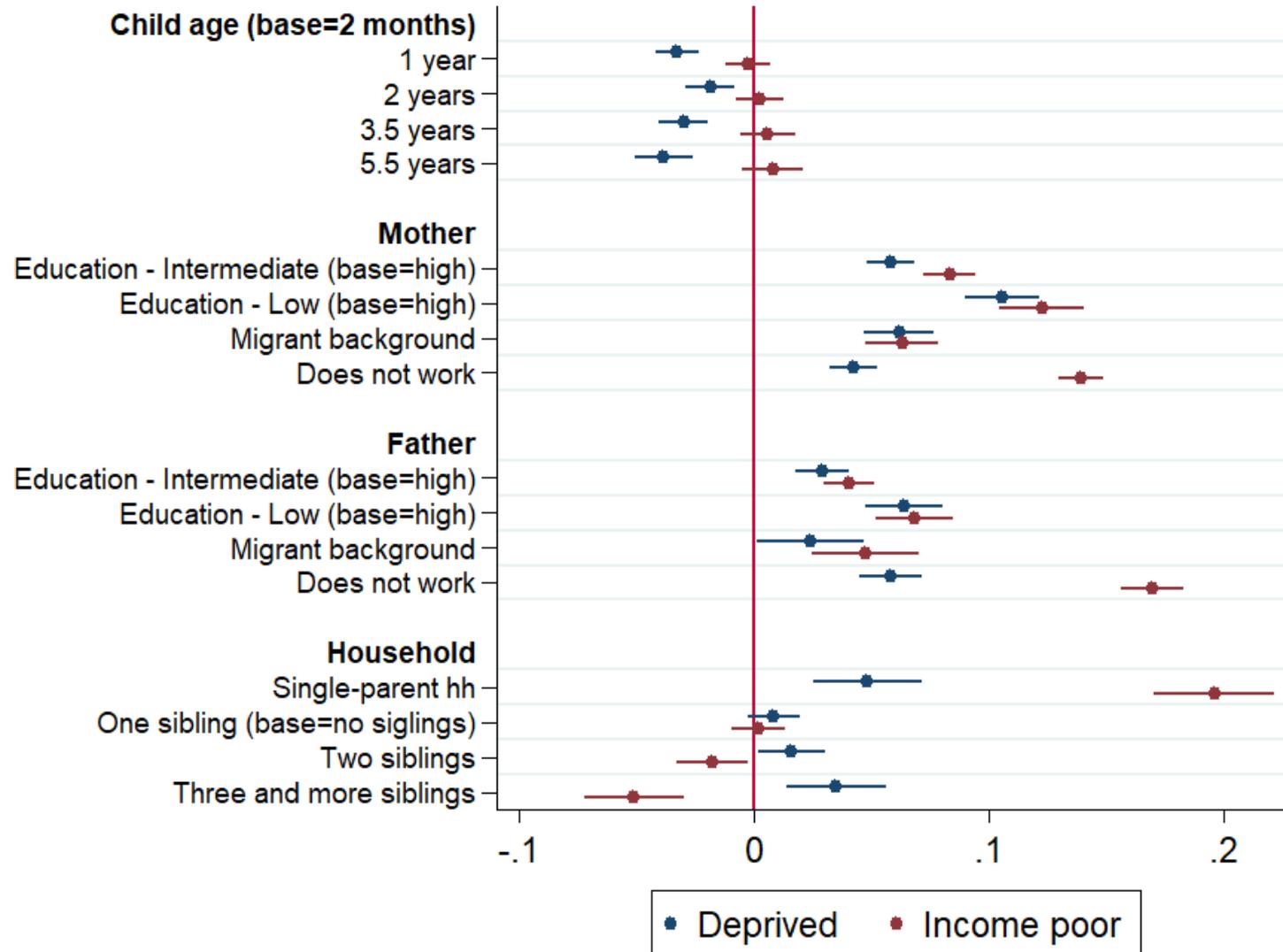
Robustness of multidimensional deprivation

The methodology is sensitive to the underlying choices:

- the number and choice of indicators and dimensions;

- the weights used to aggregate the indicators into the dimensions and the weights used to aggregate the dimensions into the overall index;

- the cut-offs used within each dimension and the cut-off across dimensions to define a multidimensionally deprived child.

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Distribution of children by the depth of deprivation

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Combinations of deprivation dimensions among deprived children

Health+Housing – 45.2%
Health+Material – 15.0%
Health+Parenting – 12.5%
Material+Housing+Health – 6.7%
Other combinations – 20.7%

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Figure 2 – Marginal effects of different combinations of deprivation on health outcomes (base – not deprived)