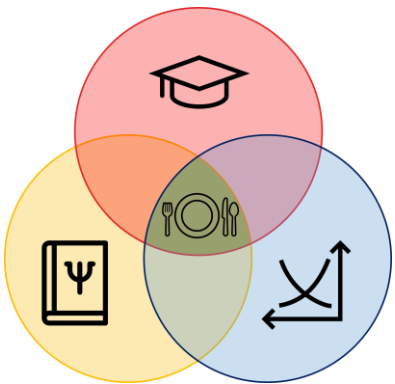


Bad health and food insecurity among food assistance recipients: evidence from France

Romane Vandroux, Université Catholique de Lille

François Charles Wolff, LEMNA



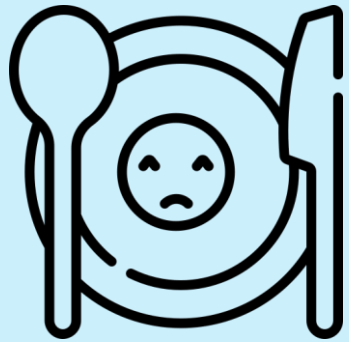
« Précarité, santé et comportements alimentaires : une analyse microéconomique et expérimentale »

Context

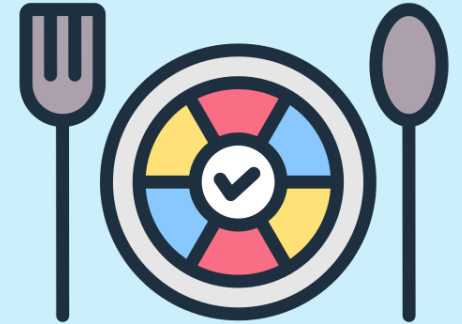
'Lack of access to adequate food, for normal growth and development, for a healthy and active life'.

Food Insecurity

Context



Quantitative



Qualitative

Food Insecurity



Psychological



Social

Context

Sample

Precarity :

Poverty, unemployment and family structures, network and social isolation



Food Insecurity

Consequences

Physical health :

Chronic diseases, obesity, diabetes, hypertension, asthma, premature mortality



Mental health :

Anxiety, depression



Literature: empirical studies in France



Limited studies based on:

- **Geography** (Martin-Fernandez et al., 2013, Martin-Fernandez et al., 2014)
- **Temporality** (e.g. INCA2 2006-2007 survey, Dubuisson et al., 2010).
- **Measurement** (e.g. Longitudinal Cohort of Employees, Pryor et al., 2016).

‘The question of **causality and endogeneity** has been largely neglected in the various empirical studies of the relationship between food insecurity and health’. (Gundersen & Ziliak, 2015)

Literature: empirical studies in France

‘The question of causality and endogeneity has been largely neglected in the various empirical studies of the relationship between food insecurity and health’ (Gundersen & Ziliak, 2015)

- Sample
 - Recent
 - Not limited geographically
 - Quantitative (sufficient statistical power)

Method: Survey questionnaire (INSEE, 2021)

Participants : 4066 recipients of food aid in France, random **face-to-face** interviews in **235** distribution centers

Measures

- **Food insecurity**

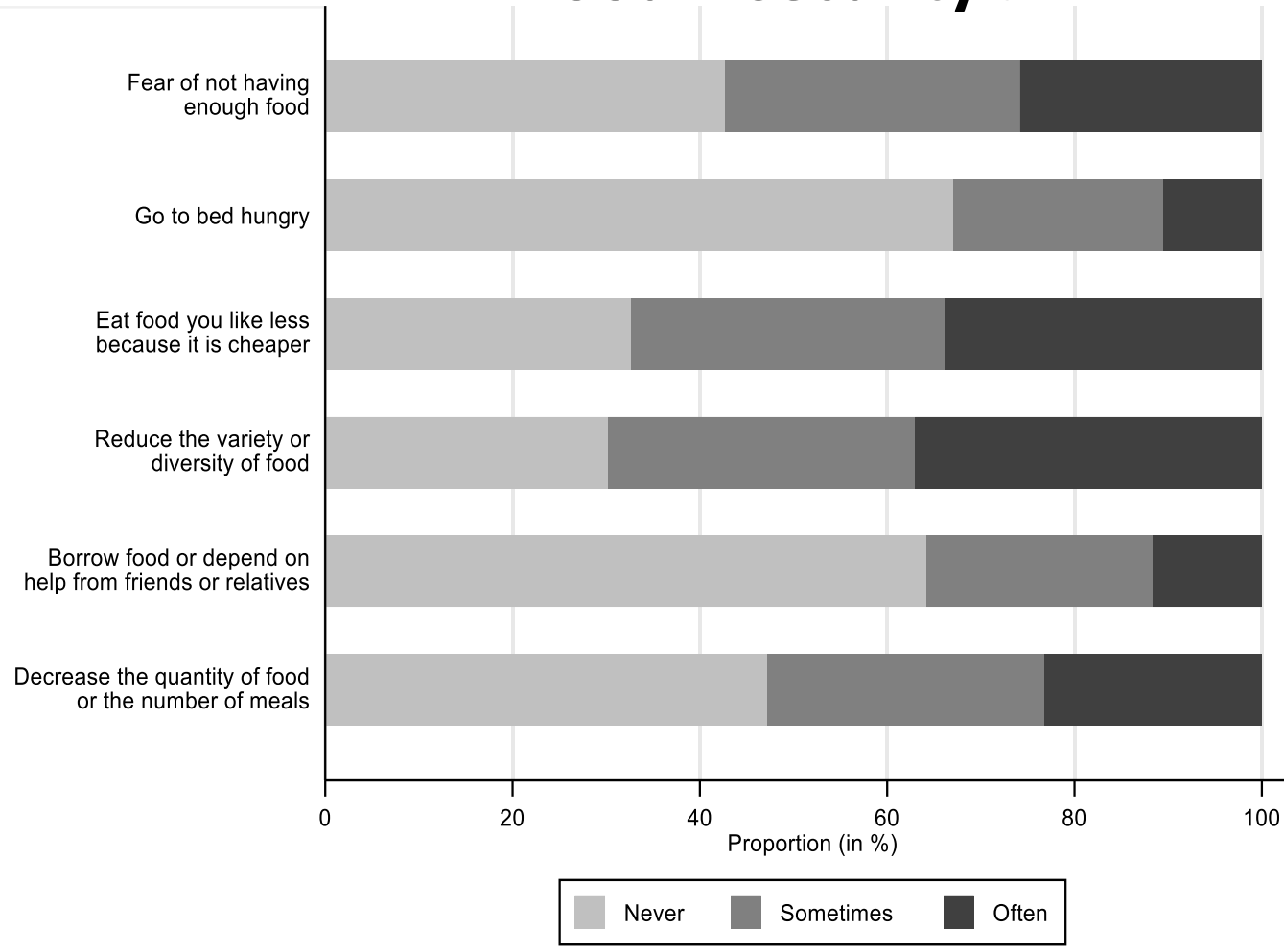
1. Reducing the amount of food at mealtimes or cutting down on the number of meals you eat
2. Going to bed hungry
3. Eating food you like less because it's cheaper
4. Reducing the variety or diversity of foods eaten
5. Fear that the household does not have enough food
6. Borrowing food or getting help from friends or relatives

- **Health**

- Self-assessment
- Limitations in daily activities
- Presence or absence of chronic illness

Results : Characterisation of the population

Food insecurity :



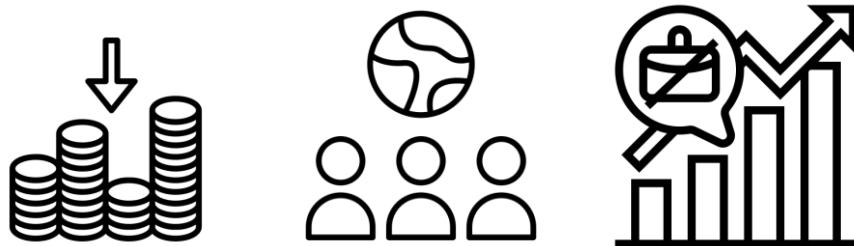
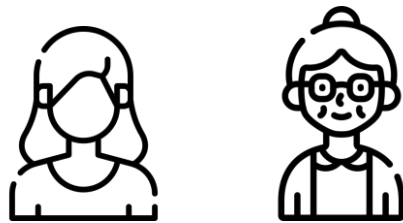
- Households more concerned about eating cheaper or reducing food variety
- Around 50% said they were afraid of running out of food and reduced the frequency or quantity of meals
- Around 30% of people go to bed hungry and borrow food from friends or family

Results : Characterisation of the population

Comparison with the employment survey sample 2021 (n = 254 794)

➤ Differences in socio-professional characteristics :

- Gender
- Age
- Professional status
- Level of education
- Nationality
- Income



➤ Health-related characteristics: twice as likely to feel in poor health

- 50% in poor (or average) health
- 50% with a chronic illness
- 40% limited in their activities
- With disparities: gender, age, nationality at birth

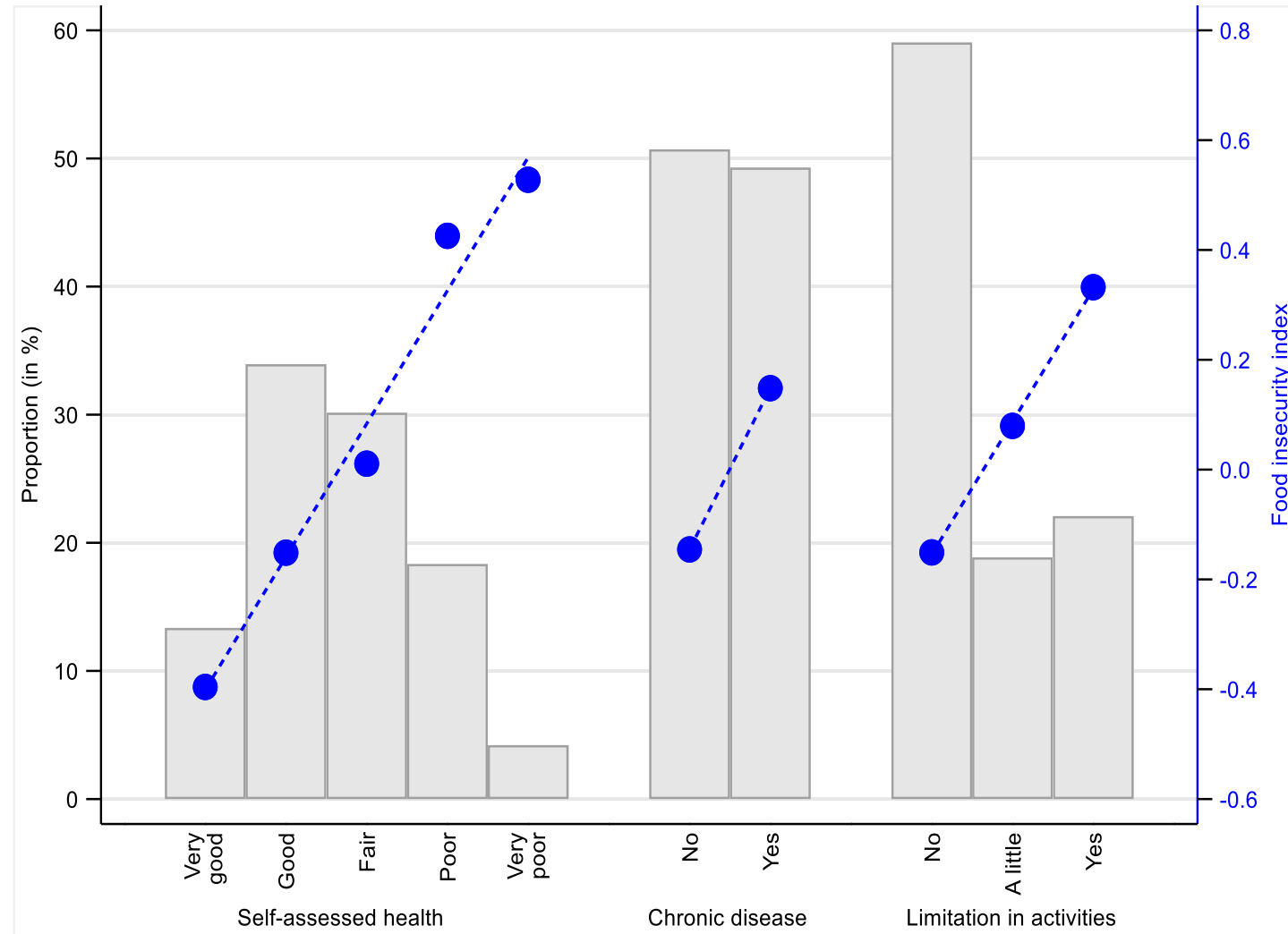


Results :

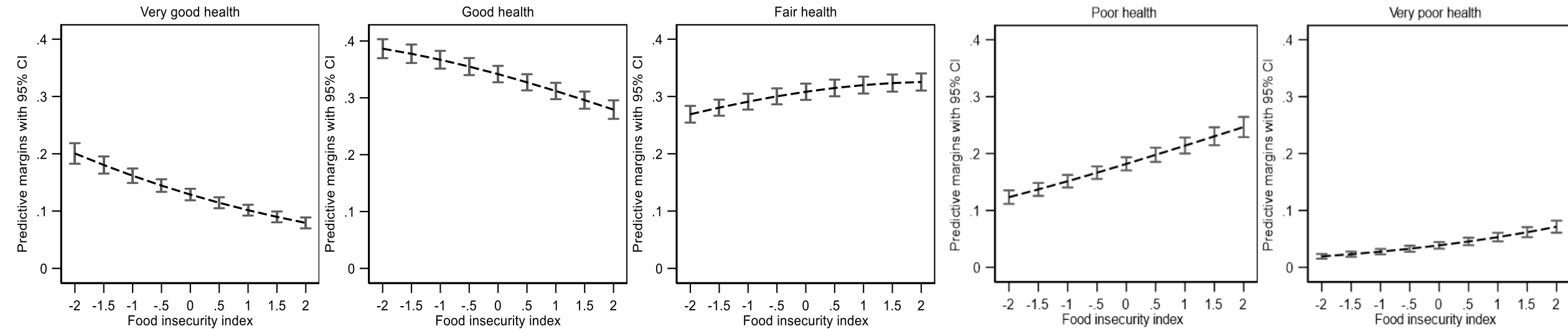
Correlation between food insecurity and health

Positive correlation between food insecurity and

1. Self-rated health
2. Presence of chronic illness
3. Activity limitations



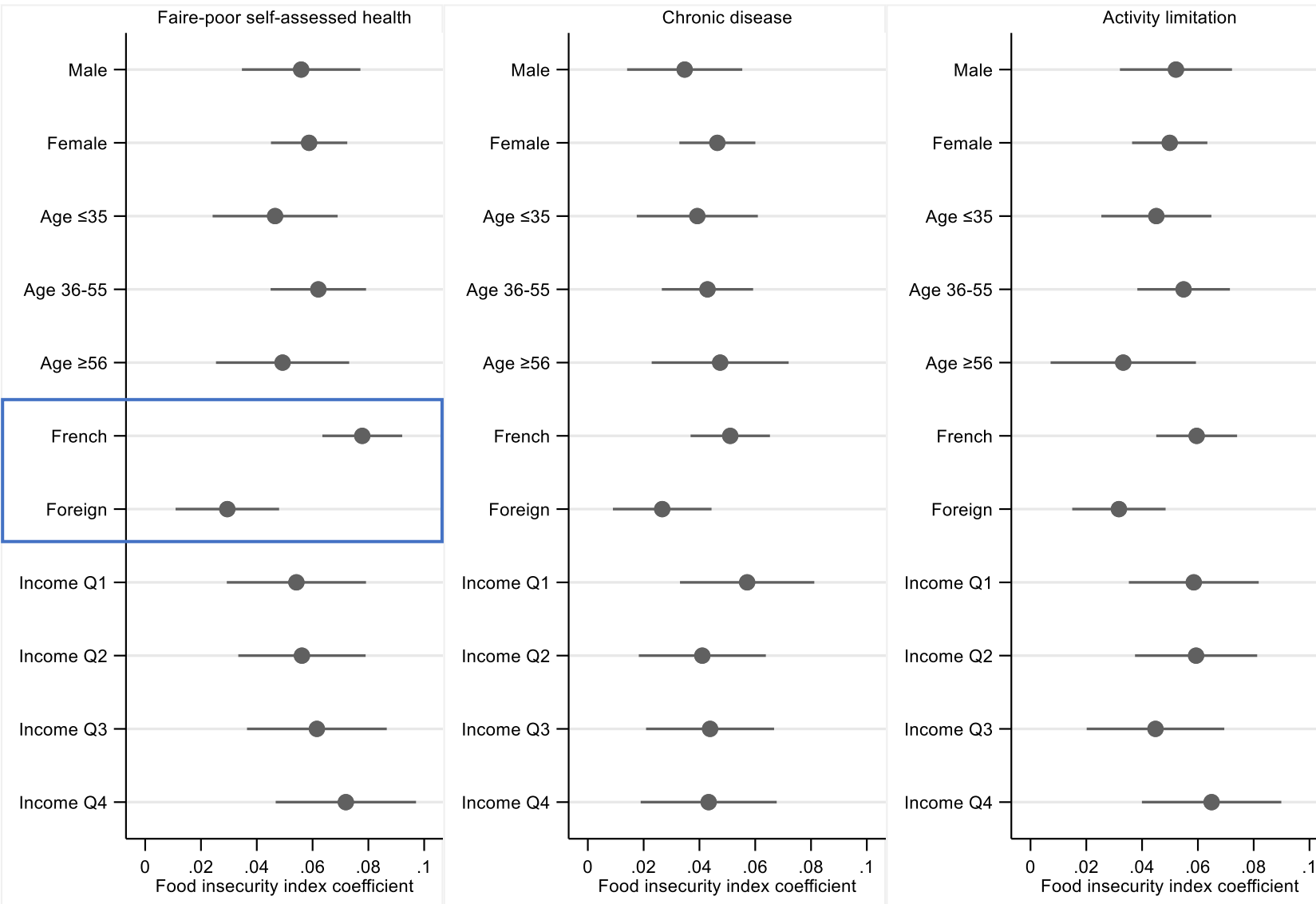
Results : Self-rated health (estimates for ordered probit model)



Average probability of a given health outcome as a function of food insecurity :

- **Very good health:** probability halved
- **Good health:** less pronounced decrease
- **Fair health:** increase with limited influence of food insecurity
- **Poor and very poor health:** high increase

Results : heterogeneity of results



1. A consistently positive relationship between food insecurity and health
2. Difference in self-assessment of health according to nationality of birth

Results : $H_i^k = \delta^k * FII_i + X_i\beta^k + \varepsilon_i^k$

Positive correlation between food insecurity and

1. Self-rated health
2. Presence of chronic illness
3. Activity limitations

Variables	(1) Average/poor self-rated health	(2) Chronic illness	(3) Activity limitation
Linear probability estimation (OLS)			
Food insecurity index	0.051*** (9.54)	0.036*** (6.64)	0.044*** (8.17)
Control variables	NO	NO	NO
Fixed effects - distribution centre	NO	NO	NO
Number of observations	4,066	4,066	4,066

Results : $H_i^k = \delta^k * FII_i + X_i\beta^k + \varepsilon_i^k$

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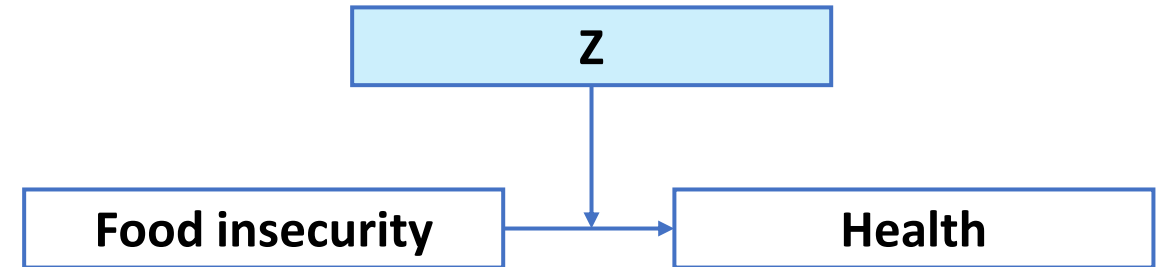
Results : $H_i^k = \delta^k * FII_i + X_i\beta^k + \varepsilon_i^k$

Positive correlation between food insecurity and

1. Self-rated health
2. Presence of chronic illness
3. Activity limitations

Variables	(1) Average/poor self-rated health	(2) Chronic illness	(3) Activity limitation
Linear probability estimation (OLS)			
Food insecurity index	0.058*** (10.22)	0.044*** (7.93)	0.050*** (9.09)
Control variables	YES	YES	YES
Fixed effects - distribution centre	YES	YES	YES
Number of observations	4,066	4,066	4,066

Results :



Combating endogeneity bias :

- **Measurement error**
- **Omitted variable bias:** exploring the sensitivity of a treatment (Krauth, 2016; Oster, 2019; Masten et al., 2024)

= test the sensitivity of the results to this bias by simulating different scenarios for these unobserved variables.

‘The question of causality and endogeneity has been largely neglected in the various empirical studies of the relationship between food insecurity and health’ (Gundersen & Ziliak, 2015)

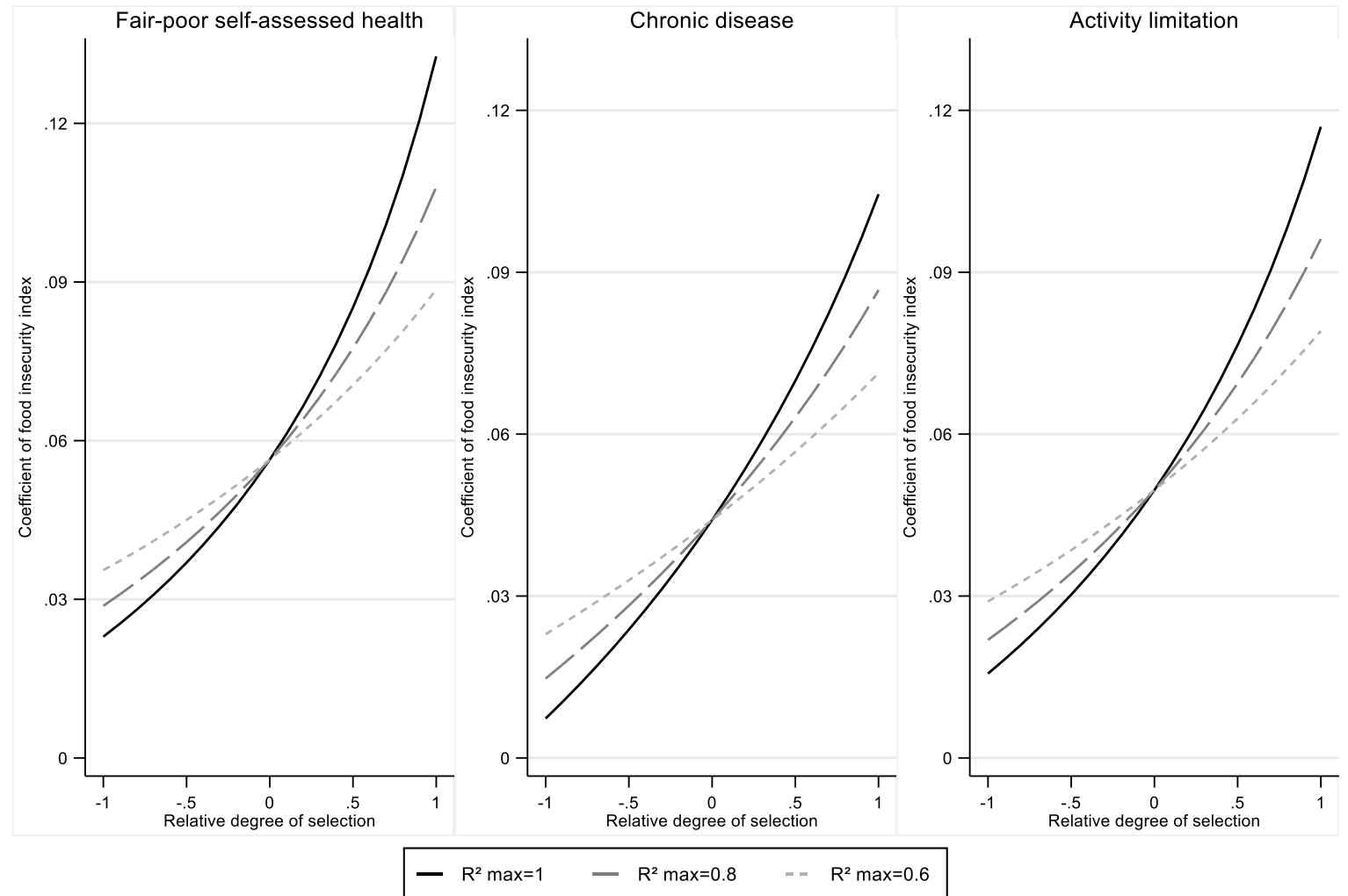
Results :

Considering the effect of omitted variables :

Combating endogeneity bias :

- **Measurement error**
- **Omitted variable bias:** exploring the sensitivity of a treatment

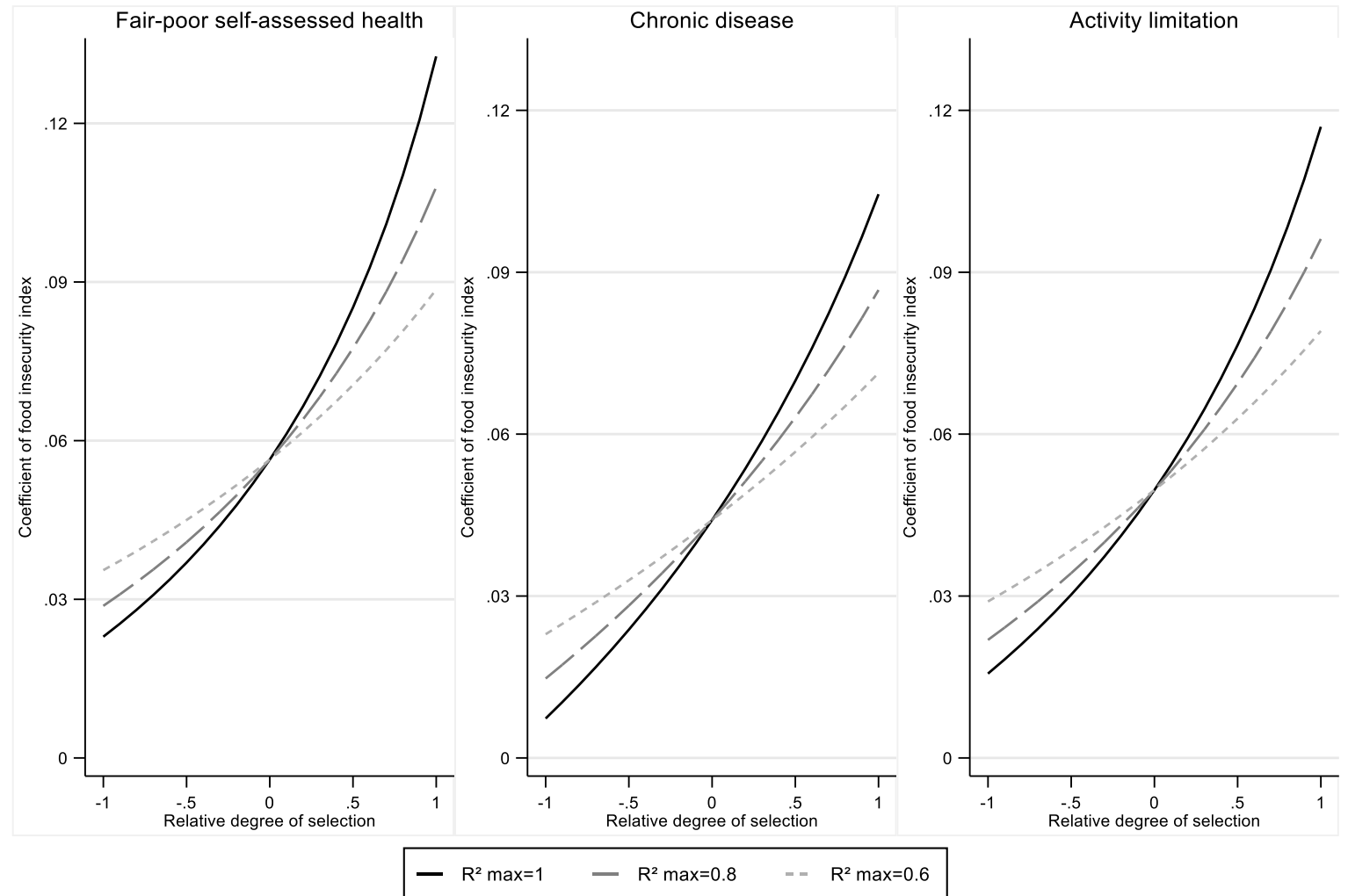
Exploring the sensitivity of a treatment
(Krauth, 2016; Oster, 2019; Masten et al., 2024)



Results :

Combating endogeneity bias :

- **Measurement error**
- **Omitted variable bias:** exploring the sensitivity of a treatment
- **Simultaneity bias:** instrumental variables and the special regressor method



Results :

Combating endogeneity bias :

- **Measurement error**
- **Omitted variable bias:** exploring the sensitivity of a treatment
- **Simultaneity bias:** instrumental variables and the special regressor method (S.R = age) (Lewbel et al., 2012 ; Dong and Lewbel, 2015)

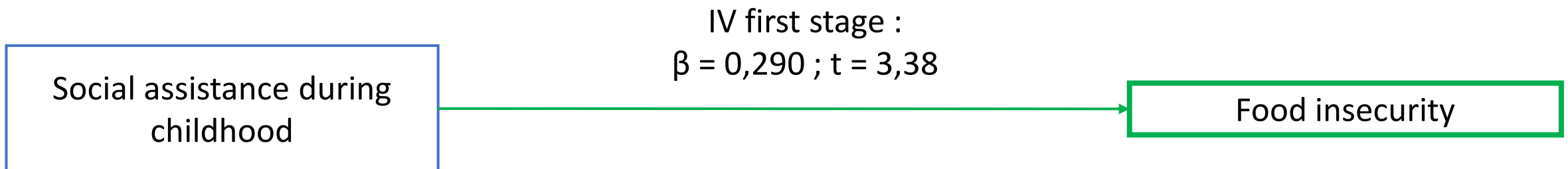
$$H(\text{health})_i^k = \delta^k * FII (\text{food insecurity})_i + X_i \beta^k + \varepsilon_i^k$$

Social assistance
during childhood

Results :

Combating endogeneity bias :

- **Measurement error**
- **Omitted variable bias:** exploring the sensitivity of a treatment
- **Simultaneity bias:** instrumental variables and the special regressor method (S.R = age) (Lewbel et al., 2012 ; Dong and Lewbel, 2015)



Results : $H_i^k = \delta^k * FII_i + X_i\beta^k + \varepsilon_i^k$

Positive correlation between food insecurity and :

1. Self-rated health
2. Presence of chronic illness
3. Activity limitations

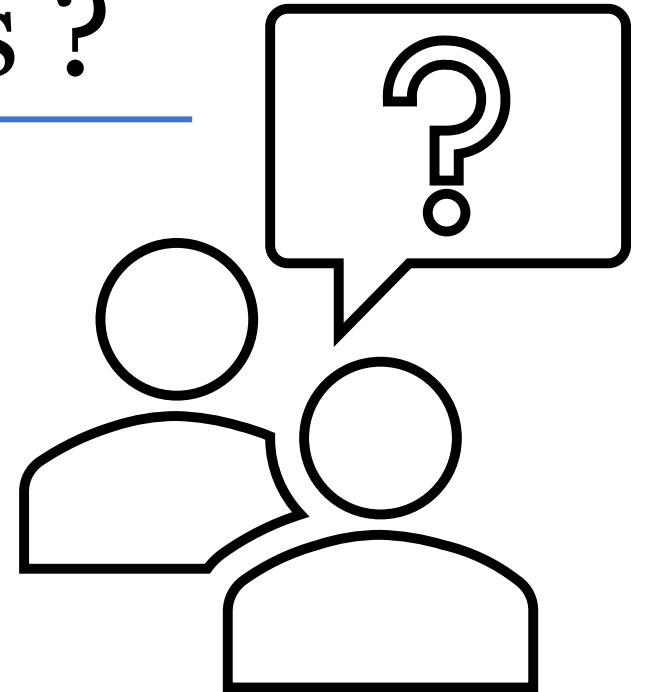
Variables	(1) Average/poor self-rated health	(2) Chronic illness	(3) Activity limitation
Linear probability estimation (OLS)			
Food insecurity index	0.056*** (10.77)	0.044*** (8.50)	0.050*** (9.63)
Control variables	YES	YES	YES
Fixed effects - distribution centre	NO	NO	NO
Number of observations	4,066	4,066	4,066
R ²	0.126	0.165	0.137
Kernel density estimator (Trimming 1%)			
Food insecurity index (endogenous)	0.086*** (5.05)	0.096*** (6.41)	0.082*** (10.04)
Number of observations	3,986	3,986	3,986

Conclusion

- Detailed analysis of the relationship between food insecurity and health using data survey from INSEE
- Main result : positive association food insecurity and health
- Robust to omitted variable and simultaneity
- Potential limits :
 - Food aid recipients in 2021
 - Limited measure of health outcomes
 - Cross-sectional data

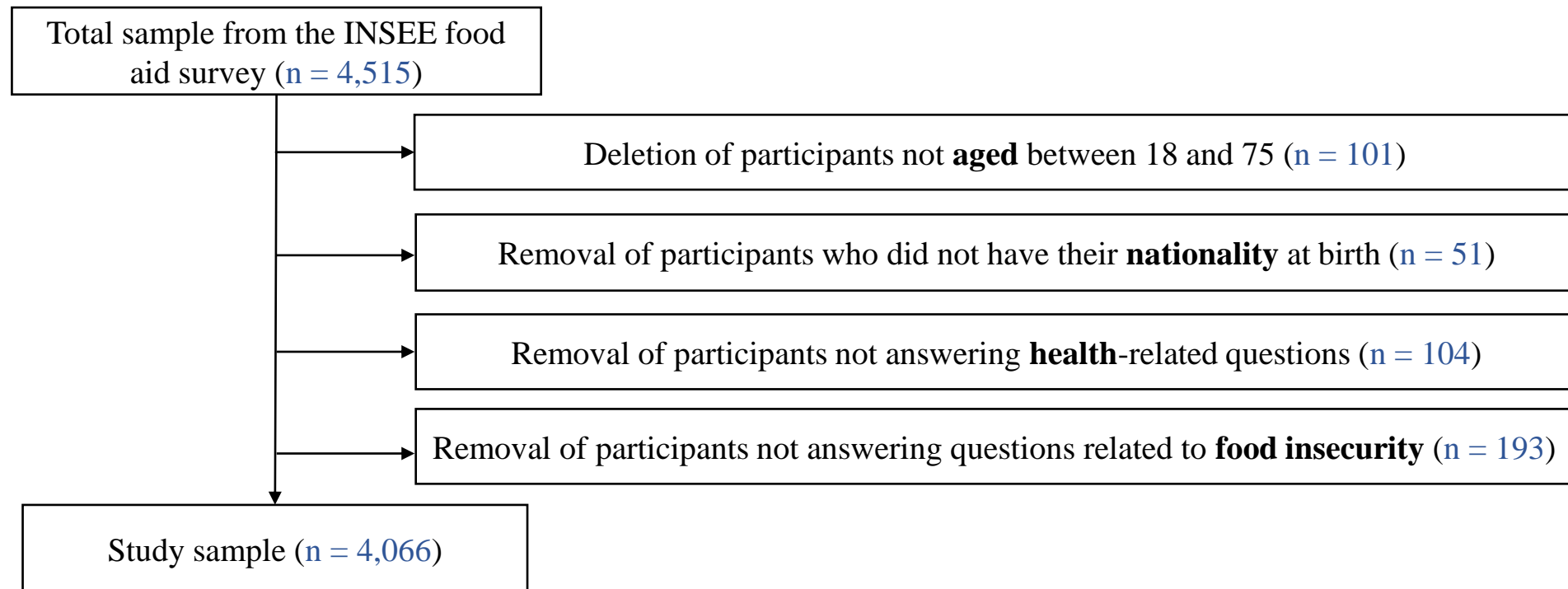
Thank you for your attention!

Do you have any questions ?



Method - sample

- **Participants:** 4066 participants receiving food aid in mainland France (i.e. excluding DROM-COM)
- **Cleaning up our sample data:** age, nationality, health and food insecurity



Endogeneity problems: simultaneity

Special regressor method

The special regressor method :

- Requires a special regressor S which satisfies the following properties:
- S is exogenous and additive to the error in the result equation.
 1. S is distributed continuously and has strong support.
 2. It is preferable for S to have a thick-tailed distribution.

+

The estimator requires a set of instruments with conventional properties (e.g. two-stage least squares estimation).

Special regression method = true IV estimator, probability estimates between 0 and 1

- Allows unknown forms of heteroscedasticity to be taken into account in the model errors.

Special regressor = age (exogenously determined, poor health increases with age)

Correlation between food insecurity and health

Variables	(1) Poor self-assessed health	(2) Chronic disease	(3) Activity limitation
Panel A. Kernel density estimator - age 18-75			
A1. Trimming 1%	0.089***	0.096***	0.082***
Food insecurity index (endogenous)	(5.05)	(6.41)	(10.04)
Number of observations	3,986	3,986	3,986
A2. Trimming 2.5%			
Food insecurity index	0.096***	0.102***	0.092***
	(8.96)	(9.13)	(9.06)
Number of observations	3,866	3,866	3,866
A3. Trimming 5%			
Food insecurity index	0.110***	0.114***	0.106***
	(6.81)	(11.09)	(8.27)
Number of observations	3,670	3,670	3,670
Panel B. Kernel density estimator - age 18-75			
B1. Trimming 1%			
Food insecurity index (endogenous)	0.089***	0.087***	0.082***
	(5.72)	(5.83)	(7.55)
Number of observations	3,335	3,335	3,335
B2. Trimming 2.5%			
Food insecurity index	0.094***	0.099***	0.086***
	(4.18)	(7.54)	(6.64)
Number of observations	3,235	3,235	3,235
B3. Trimming 5%			
Food insecurity index	0.115***	0.110***	0.095***
	(3.54)	(7.06)	(4.37)
Number of observations	3,071	3,071	3,071

Variables	(1) Fair/poor self-assessed health	(2) Chronic disease	(3) Activity limitation
Panel A. Linear probability estimates (OLS)			
Food insecurity index	0.051***	0.036***	0.044***
	(9.54)	(6.64)	(8.17)
Control variables	NO	NO	NO
Centre fixed effects	NO	NO	NO
Number of observations	4,066	4,066	4,066
R ²	0.021	0.011	0.016
Panel B. Linear probability estimates (OLS)			
Food insecurity index	0.056***	0.044***	0.050***
	(10.77)	(8.50)	(9.63)
Control variables	YES	YES	YES
Centre fixed effects	NO	NO	NO
Number of observations	4,066	4,066	4,066
R ²	0.126	0.165	0.137
Panel C. Fixed effect linear probability estimates			
Food insecurity index	0.058***	0.044***	0.050***
	(10.22)	(7.93)	(9.09)
Control variables	YES	YES	YES
Centre fixed effects	YES	YES	YES
Number of observations	4,064	4,064	4,064
R ²	0.176	0.226	0.203
Panel D. Fixed effect Logit estimates			
Food insecurity index	0.263***	0.212***	0.236***
	(9.93)	(7.83)	(8.76)
Control variables	YES	YES	YES
Centre fixed effects	YES	YES	YES
Number of observations	4058	4,060	4,045
Log likelihood	-2064.1	-1954.4	-1944.3

People who suffer more from food insecurity are, on average, in poorer health.

Discussion

As the proportion of regular beneficiaries in the survey is very low, this probably explains why food assistance through distribution sites does not eliminate the association between food insecurity and health.

