

Effect of area-level socioeconomic deprivation on mental and physical health: a longitudinal natural experiment among refugees in Germany

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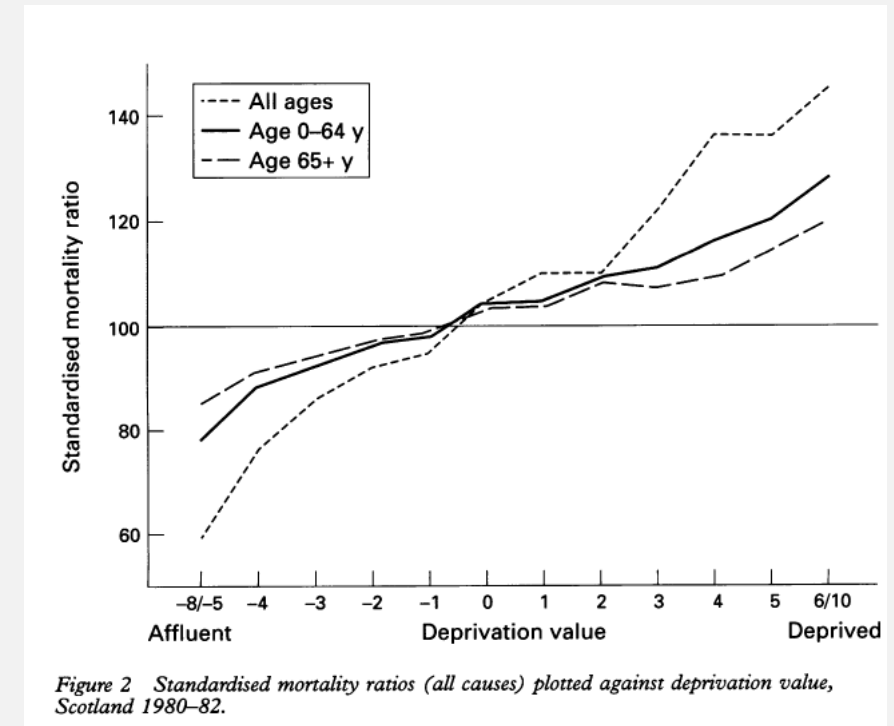
Area-level socioeconomic deprivation and health

Research into link between socioeconomic deprivation and health championed in 90s

Deprivation indices: capturing multiple aspects that are often colinear

- Unemployment, social class, overcrowding, Home/ car ownership

Difficulty: disentangling contextual from compositional effects

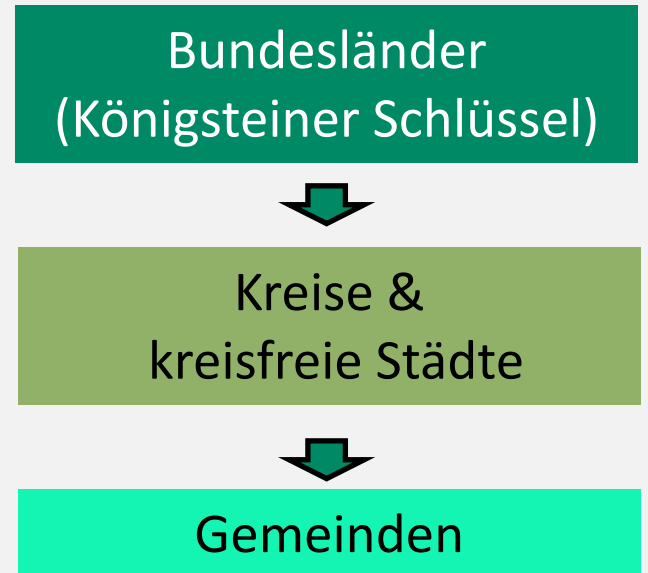


Carstairs V. Deprivation indices: their interpretation and use in relation to health. *J Epidemiol Community Health*. 1995 Dec;49 Suppl 2(Suppl 2):S3-8.

Refugee dispersal in Germany as a natural experiment to study contextual effects on health

Germany has a comprehensive residential dispersal policy





- Dispersal at federal, regional and communal levels
- Quasi random (with some exceptions)
- Movement restrictions for up to three years after positive decision („Wohnsitzauflage“)



...we're not the first with this idea

	PHYSICAL HEALTH	MENTAL HEALTH	CHILD HEALTH
Increased regional deprivation			
Increased income inequality			
Higher migrant density			
Linguistic diversity			
Life satisfaction in country of origin			

Legend

-  Positive effect
-  Mixed effects
-  Negative effect
-  No effect
- ++ High quality
- + Moderate quality
- Low quality

Biddle L, Hintermeier M, Costa D, Wasko Z, Bozorgmehr K. Context, health and migration: a systematic review of natural experiments. *eClinicalMedicine*. 2023 Oct 1 64(102206).

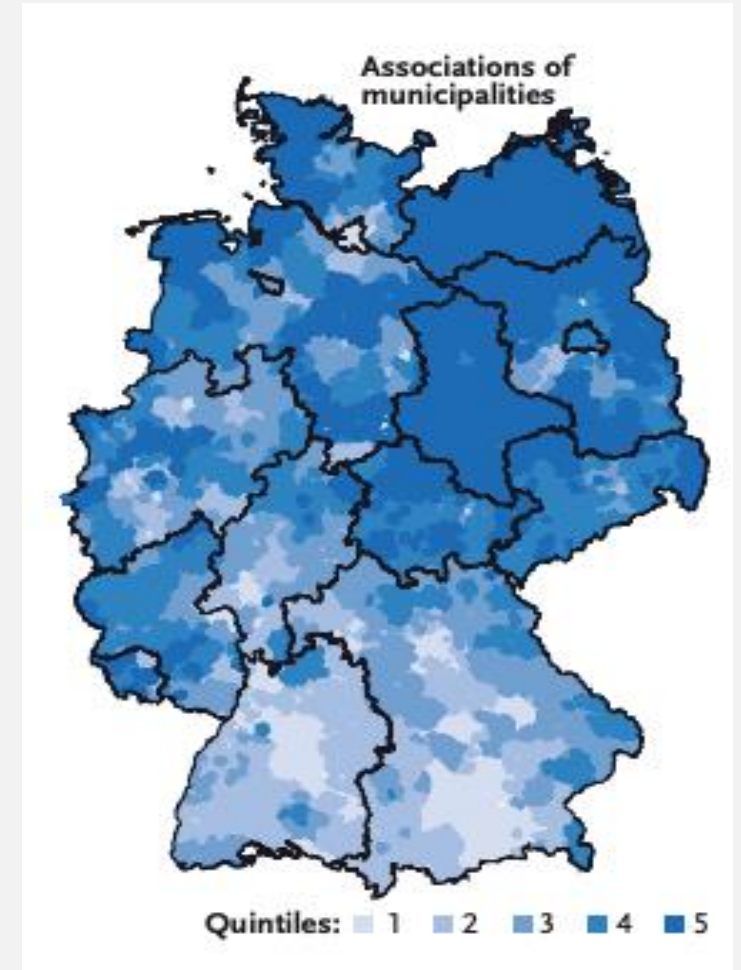
Research questions

IAB-SOEP-BAMF Panel
2016-2018

German Index of
Socioeconomic Deprivation

Mcs & pcs scores of the SF12

1. What impact does living in a region of high deprivation have on the mental and physical health of refugees?
2. Which attributes of the neighbourhoods help explain the observed relationship?

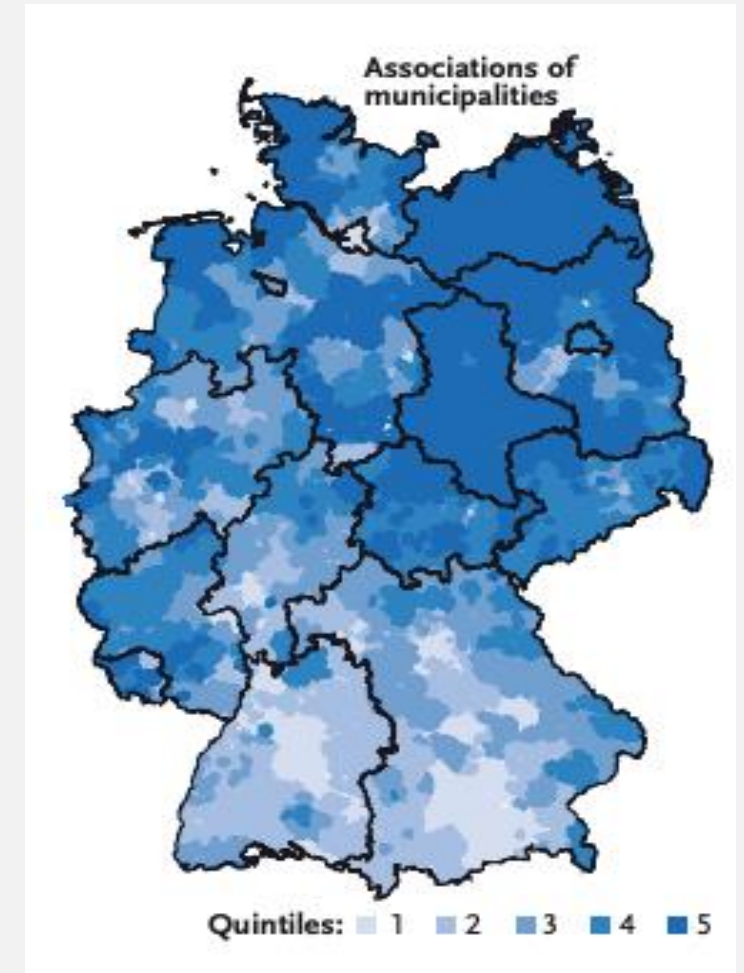


Michalski N, Reis M, Tetzlaff F, Herber M, Kroll LE, Hövener C, et al. German Index of Socioeconomic Deprivation (GISD): Revision, Aktualisierung und Anwendungsbeispiele.6 2022 Nov. Journal of Health Monitoring.

Methods

Available at level of communes
(Gemeinden; Local Area Unit-2)

Dimension	Merkmal	Indikator	Quelle	Verfügbarkeit
Bildung	Beschäftigte mit (Fach-)Hochschulabschluss	Anteil der sozialversicherungspflichtig Beschäftigten am Wohnort mit akademischem Abschluss an den sozialversicherungspflichtig Beschäftigten am Wohnort in %	Statistik der Bundesagentur für Arbeit	Kreise für die Jahre 2001–2011 und 2013–2019*
Bildung	Beschäftigte ohne Abschluss	Anteil der sozialversicherungspflichtig Beschäftigten am Wohnort ohne Berufsabschluss an den sozialversicherungspflichtig Beschäftigten am Wohnort in %	Statistik der Bundesagentur für Arbeit	Kreise für die Jahre 2001–2011 und 2013–2019*
Bildung	Schulabgängerinnen und -abgänger ohne Abschluss	Anteil der Schulabgängerinnen und -abgänger ohne Hauptschulabschluss an den Schulabgängerinnen und -abgängern in %	Statistik der allgemeinbildenden Schulen des Bundes und der Länder	Kreise für die Jahre 1998–2019
Beschäftigung	Arbeitslosigkeit	Anteil der Arbeitslosen an den Einwohnerinnen und Einwohnern im erwerbsfähigen Alter	Statistik der Bundesagentur für Arbeit	GVB für die Jahre 1998–2019**
Beschäftigung	Beschäftigtenquote	Sozialversicherungspflichtig Beschäftigte am Wohnort je 100 Einwohnerinnen und Einwohner im erwerbsfähigen Alter	Statistik der Bundesagentur für Arbeit	GVB für die Jahre 1998–2019**
Beschäftigung	Bruttolohn und -gehalt	Monatlicher Bruttoverdienst der Arbeitnehmerinnen und Arbeitnehmer in Euro	Volkswirtschaftliche Gesamtrechnung der Länder	Kreise für die Jahre 2000–2019
Einkommen	Haushaltsnettoeinkommen	Durchschnittliches Haushaltseinkommen in € je Einwohnerinnen und Einwohner	Volkswirtschaftliche Gesamtrechnung der Länder	Kreise für die Jahre 2000–2019
Einkommen	Schuldnerquote	Private Schuldnerinnen und Schuldner je 100 Einwohnerinnen und Einwohner 18 Jahre und älter in %	Schuldneratlas Deutschland des Verbands der Vereine Creditreform e. V.	Kreise für die Jahre 2004–2019
Einkommen	Steuereinnahmen	Einkommensteuer in € je Einwohnerinnen und Einwohner	Realsteuervergleich des Bundes und der Länder	GVB für die Jahre 1998–2019



Michalski N, Reis M, Tetzlaff F, Herber M, Kroll LE, Hövener C, et al. German Index of Socioeconomic Deprivation (GISD): Revision, Aktualisierung und Anwendungsbeispiele. 2022 Nov. Journal of Health Monitoring. 7

Methods

Selection of individuals subject to mobility restrictions (at regional level) at t0

➤ Applies to individuals with:

- i. Pending asylum status
- ii. Rejected asylum status/ temporary right to remain
- iii. For three years following positive decision if dependent on state benefits (extension in 2016, but uneven implementation over time and by federal state)

➤ Combining information on asylum status, federal state and time of interview

Assessment of eligibility for residential mobility restrictions (assessed for each record to capture variability over time):

Not subject to mobility restrictions:	3 162
Mobility due to pending asylum decision:	1 171
Mobility restrictions due to negative asylum outcome:	328
Mobility restrictions due to „Wohnsitzauflage“ policy:	1 205

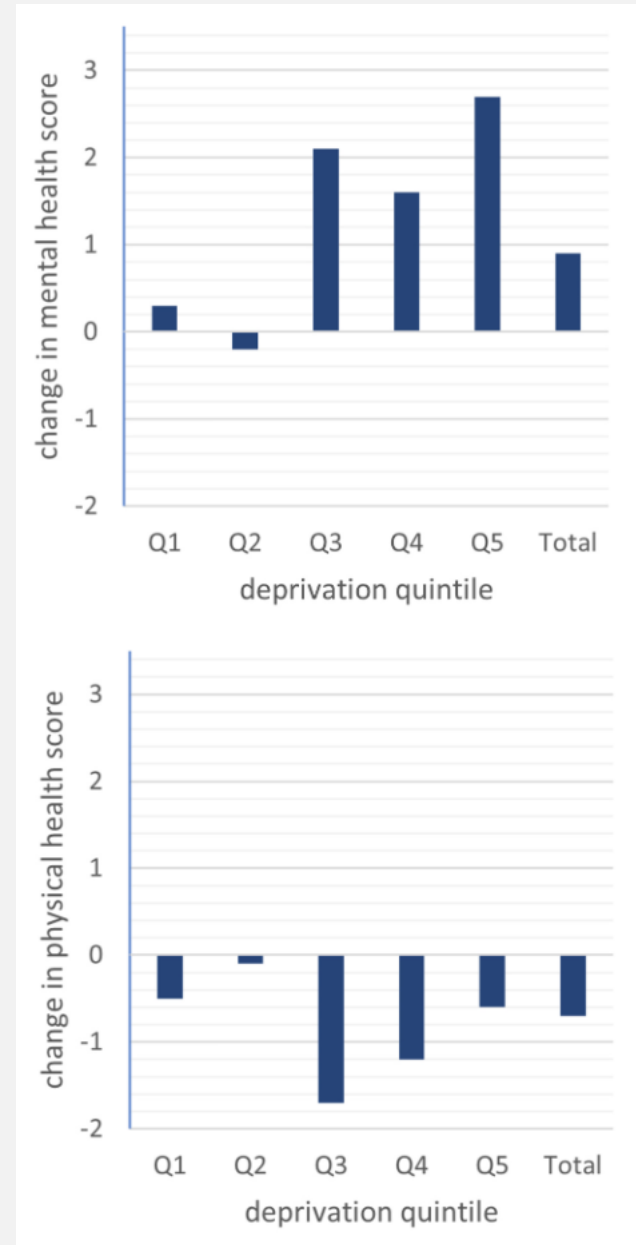
Methods

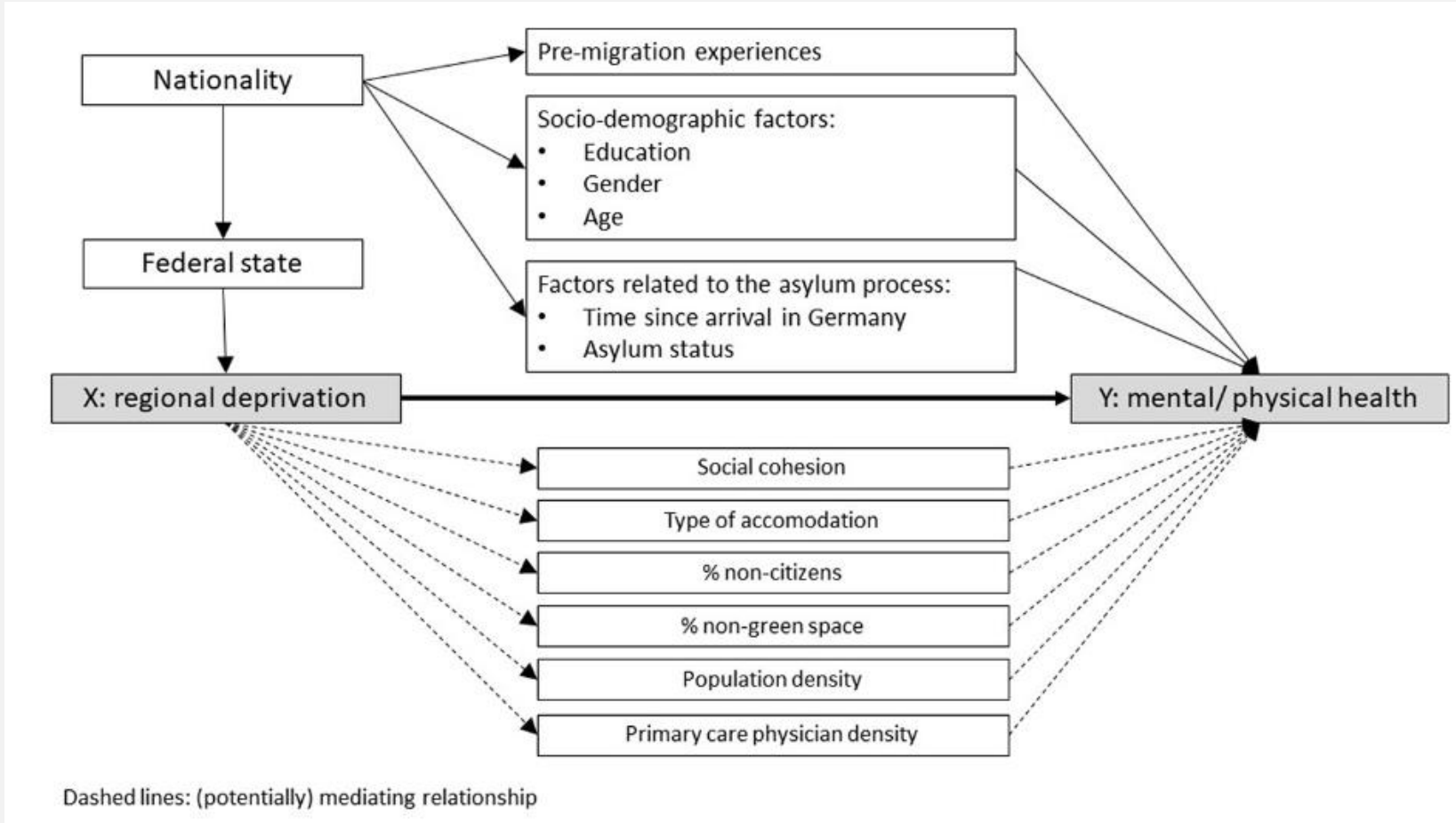
Difference-in-difference analysis

- Change in mcs/pcs score (over 1-2 years of follow-up) between deprivation quintiles

Multi-level linear regression models

- Random intercept to account for clustering at the level of communes

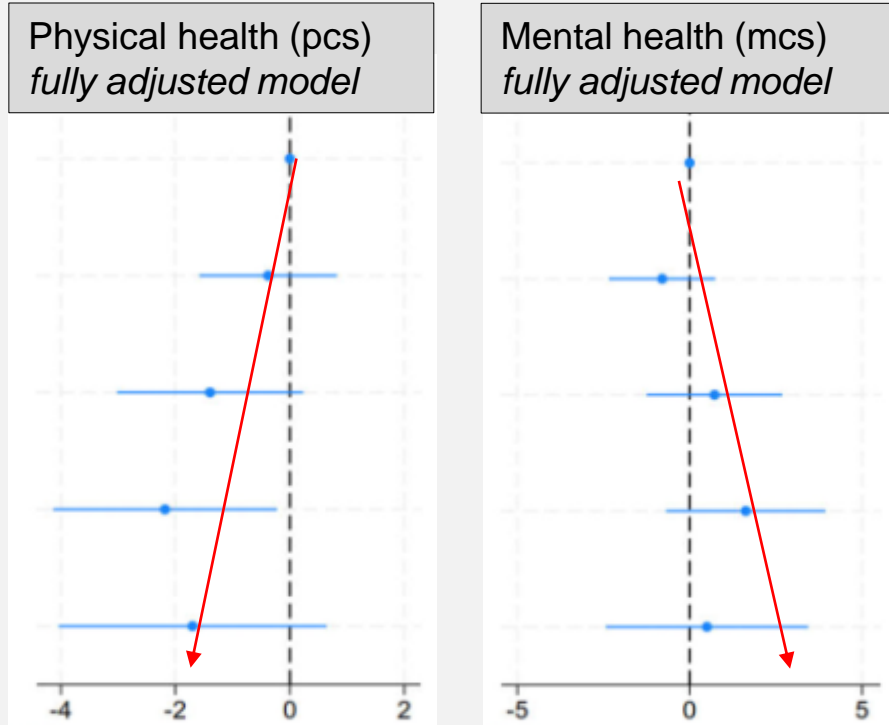




Results

n=1466

GISD Quintiles



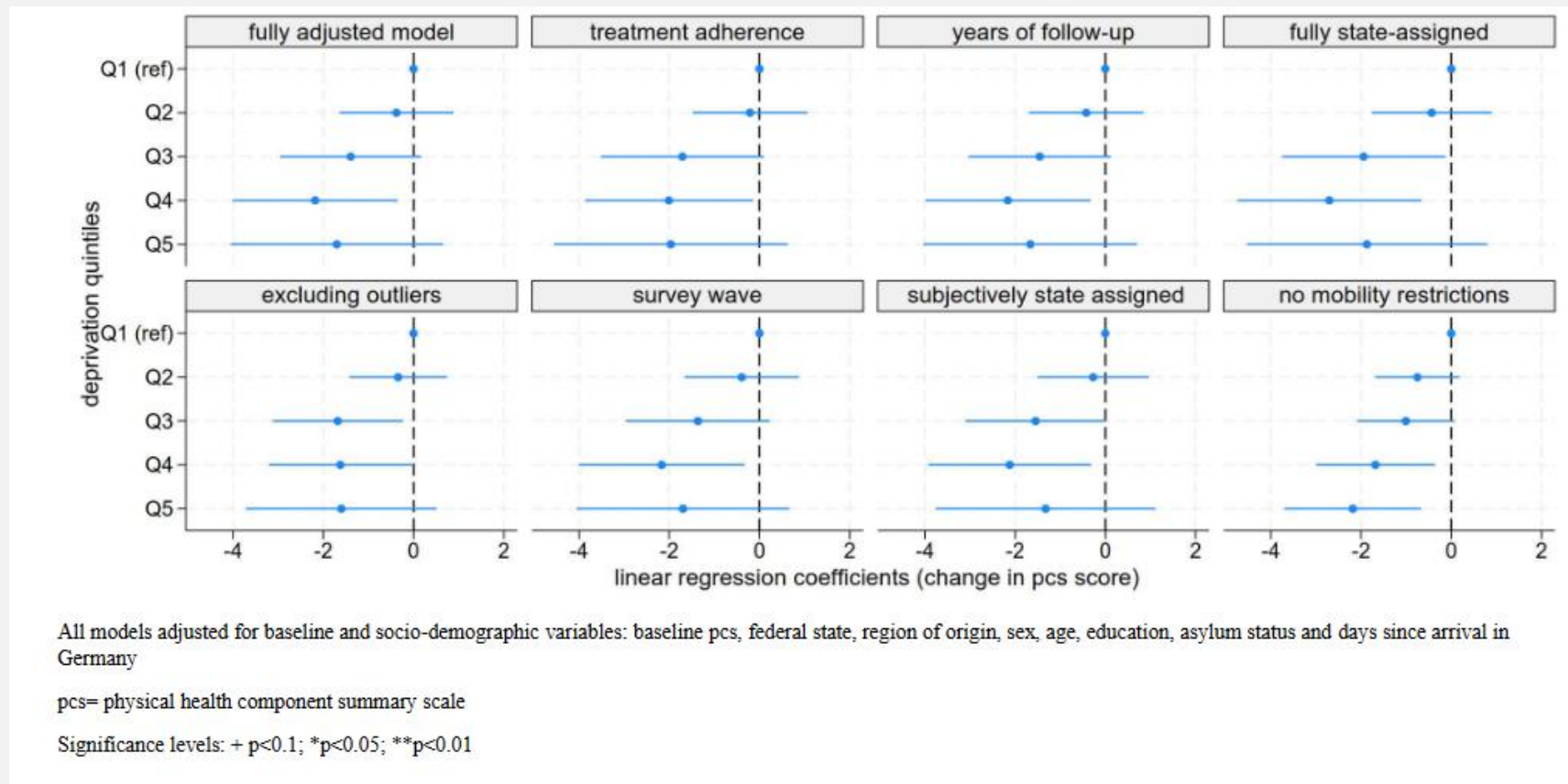
Point change in pcs/mcs scale (t1-t0)

Models adjusted for:

- region of origin
- federal state
- age, sex, education
- time since arrival
- asylum status

No substantial explanatory power of neighbourhood characteristics explored in mediation analyses

Sensitivity analyses pcs



Conclusions

Results suggest a negative effect of deprivation on physical health

- Result congruent with other studies, including other natural experiments, but here over a much shorter timescale
- Unlikely to be accumulation of health risk, more likely to be caused by service access issues

Cannot confirm negative effect of deprivation on mental health found in other studies

- May be partially explained by broad, unspecific mental health outcome
- Rather see a potential positive of regional deprivation on mental health -> needs to be explored in larger samples over longer timescales

- 1) Reported level of social cohesion, captured by the perceived safety of the neighbourhood and worries about hostility to foreigners, as suggested by Kress et al. ([Kress et al., 2020](#)).
- 2) Type of accommodation (private vs. shared)
- 3) Total and same-nationality proportion of non-citizens at regional (NUTS-3) level, with data captured 12/2017 and taken from the Database of the German Statistical Office (GENESIS) ([Statistisches Bundesamt \(Destatis\), 2023a](#))
- 4) Proportion of non-green space at communal level (proxied by proportion of land used for industry, traffic and residential areas, minus parks and recreational spaces), captured 12/2017 and taken from the Database of the German Statistical Office (GENESIS) ([Statistisches Bundesamt \(Destatis\), 2023b](#))
- 5) Population density at regional (NUTS-3) level (population/km²)
- 6) Primary care physician density as a proxy for health care accessibility at regional (NUTS-3) level for the year 2019 ([Kassenärztliche Bundesvereinigung, 2023](#))

Table S9: Outcomes of mediation analyses pcs

	Fully adjusted model	Mediation: social cohesion	Mediation: type of accommodation	Mediation: % non-citizens	Mediation: % same-nationality non-citizens	Mediation: % land used for infrastructure	Mediation: population density	Mediation: primary care physician density
Clustering	none	none	none	none	none	none	none	none
Q1 (lowest deprivation)	ref	ref	ref	ref	ref	ref	ref	ref
Q2 (moderate-low deprivation)	-0.37882 (-1.64378 - 0.88614)	-0.48185 (-1.73277 - 0.76907)	-0.36253 (-1.58134 - 0.85628)	-0.31377 (-1.65122 - 1.02369)	-0.27377 (-1.52888 - 0.98133)	-0.66647 (-1.99018 - 0.65724)	-0.76688 (-2.08750 - 0.55375)	-0.38424 (-1.64760 - 0.87912)
Q3 (moderate deprivation)	-1.39302+ (-2.96046 - 0.17441)	-1.38869 (-3.06074 - 0.28335)	-1.31573 (-2.92719 - 0.29573)	-1.33568 (-3.03078 - 0.35943)	-1.35042+ (-2.94191 - 0.24106)	-1.56397+ (-3.18573 - 0.05778)	-1.70763* (-3.34517 - -0.07009)	-1.39036+ (-2.95796 - 0.17724)
Q4 (moderate-high deprivation)	-2.18030* (-4.00874 - -0.35185)	-2.13815* (-4.11990 - -0.15640)	-2.06468* (-3.97699 - -0.15238)	-2.16912* (-4.11272 - -0.22552)	-2.31052* (-4.27210 - -0.34894)	-2.04957* (-3.93642 - -0.16272)	-2.33232* (-4.28680 - -0.37784)	-2.17753* (-4.00790 - -0.34716)
Q5 (high deprivation)	-1.69936 (-4.05252 - 0.65379)	-1.75411 (-4.06624 - 0.55802)	-1.64551 (-3.99328 - 0.70225)	-1.66269 (-4.02029 - 0.69491)	-1.53116 (-3.97378 - 0.91146)	-1.77764 (-4.17365 - 0.61836)	-1.86947 (-4.19659 - 0.45764)	-1.70803 (-4.06628 - 0.65023)
Very safe neighbourhood		ref						
Fairly safe neighbourhood		-0.04603 (-1.26364 - 1.17158)						
Fairly/ very unsafe neighbourhood		-0.17255 (-2.12890 - 1.78381)						
A lot of worries about hostility to foreigners		ref						
Some worries about hostility to foreigners		-0.51542 (-2.85260 - 1.82177)						
No worries about hostility to foreigners		-0.80885 (-3.02922 - 1.41151)						
Shared accommodation			ref					
Private accommodation			-0.29847 (-1.24540 - 0.64847)					
Proportion of non-citizens in region				0.01487 (-0.10501 - 0.13474)				
Proportion of same-nationality non-citizens in region					0.50806 (-0.84919 - 1.86532)			
Proportion of land used for infrastructure						-0.04023* (-0.07686 - -0.00359)		
Population density							-0.00059+ (-0.00125 - 0.00007)	
Density of primary care physicians								-0.00616 (-0.07110 - 0.05878)
Observations	1,400	1,370	1,397	1,395	1,390	1,385	1,395	1,400
R-squared	0.34023	0.33902	0.34008	0.34065	0.34599	0.34529	0.34221	0.34024

All models adjusted for baseline and socio-demographic variables: baseline pcs, federal state, country of origin, sex, age, education, asylum status and days since arrival in Germany

Pcs= mental health component summary scale

Significance levels: + p<0.1; *p<0.05; **p<0.01