Housing deprivation and health: A European comparison

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Agenda

1. Background and research questions
2. Data and econometric specification
3. Results and Discussion
4. Conclusions
1. Background and research questions
Housing, poverty and deprivation

- A welfare focus on housing can be justified f.i. by
  - the significance of peoples’ home for their living standards
  - the large share of household expenditures that housing accounts for

- However, housing is often neglected as a source of poverty and deprivation as well as a social policy device
  - the least decommodified sector of welfare provision or “the wobbly pillar under the welfare state” (Torgensen, 1987)
Housing deprivation and health: Pathways found in the literature

(e.g. Burridge/Ormandy, 1993; Dunn 2000)

• Effects of overcrowding:
  – Increased probability of transmission of infectious diseases
  – Mental illness

• Damp and mould
  • Mainly respiratory diseases

• Cold and heat related illness
  • Respiratory and cardiovascular diseases
  • Documented excess mortality in winter (UK)
  • Especially vulnerable children and elderly persons

➢ Existing literature mainly for UK, some recent publications on Spain (using ECHP), no comparative European literature
Housing deprivation in SILC

• **Variable of primary interest: housing deprivation**
  
  • Measured through several indicators
    
    • rooms per equalised member (based on HH030/hx040)
    
    • HH040: whether the dwelling has a problem with a leaking roof and/or damp ceilings, dampness in the walls, floors or foundation and/or rot in window frames and doors (yes/no)
    
    • HH050: affordability (ability to pay) to keep the home adequately warm (yes/no)
    
    • HH080/hh081: Bath or shower in dwelling (yes/no)
    
    • HH090/hh091: Indoor flushing toilet for sole or shared use of household (yes/no)
    
    • HHs100: HH has washing machine (yes/no)

  
  • **Cross-Sectional only:**
    
    • HS160: PROBLEMS WITH THE DWELLING: TOO DARK, NOT ENOUGH LIGHT
    
    • HS170: NOISE FROM NEIGHBOURS OR FROM THE STREET
    
    • HS180: POLLUTION, GRIME OR OTHER ENVIRONMENTAL PROBLEMS
    
    • HS190: CRIME VIOLENCE OR VANDALISM IN THE AREA
Research questions

1. Elucidate (causal) pathways of bad housing conditions on health at the individual level across European countries

2. What role do institutional factors at the national level play in moderating the effect of bad housing on health?
3. Data and econometric specification
Data

- EU-SILC UDB 2005-2008 – Panel Data
- \( i \) Observations -> \( j \) persons (-> households) -> \( k \) countries
- Gross sample size: 1,080,254 -> 428,415 -> 157,618 -> 23
- Countries included in gross sample:
  - AT, BE, BG, CY, CZ, EE, ES, FI, HU, IE, IT, LT, LU, LV, NL, NO, PL, PT, RO, SE, SI, SK, UK
- **Dependent variable**: self-assessed general health
  - 5-item scale converted to binary indicator: 1= bad/very bad health, 0= fair/good/very good health
• **Observed control variables include:**
  
  • **Micro-level**
    - Equivalised disposable income quintiles, hx100
    - Highest ISCED level attained, pe040
    - Age at the time of the interview, rx010
    - Sex, pb150
    - Marital status, pb190
    - Self-defined current economic status, pl030
    - Tenure status, hh020
    - Degree of urbanisation, db100 (not available for NL and SI)
  
  • **Macro-level (research question 2), Source: Eurostat (www)**
    - Soc. Spending: Health, pps/per capita, \( \Omega \) 05-08
    - Soc. Spending: Housing, pps/per capita, \( \Omega \) 05-08
    - Gini, \( \Omega \) 05-08
Specifications: Question 1 – a causal pathway?

- **Identification Strategy**
  - Effect of housing on health may be biased due to unobserved, time-invariant factors:
    - f.i., unhealthy consumption patterns/preferences that also influence the decision how to allocate income between housing and other goods
    - individual differences as to how susceptible individuals are to certain diseases/illness
    - differences in cognitive abilities/coping strategies concerning the awareness of health related consequences of bad housing
    - Macro: cultural and political factors that affect both health and types of housing
  - **2-way FE-Models**: controlling for time-invariant unobserved person and country fixed effects & controlling for unobserved time fixed effects
  - Fixed Effects Logistic regression model (conditional logit/MLE)
    - Unbalanced panel
    - Compared to pooled logit models w. cluster rob. S.E. (HH) & country FE & time FE
    - LPM FE for robustness checks
Specifications: Question 2: Effect heterogeneity?

- What role do institutional factors (macro factors) play?
- Focus is now on effect heterogeneity between countries
- Do group level predictors $z_{ik}$ “moderate” the relationship between an individual-level factor $x_{ij}$ (bad housing) and $y_{ij}$ (health)?
  - Cross-Level interactions between housing deprivation and policy variables: “Slopes-as-outcome Models”
- Why could this be?
  - Bad housing in differently developed/designated health systems
  - Bad housing in a context of (in)egalitarian societies
Specifications:

Question 2: Effect heterogeneity?

• Two computationally different estimation methods: 1 step estimation or 2 step estimation

• 2 step estimation
  – **First stage**: estimate separate regressions for $k$ countries with level 1 covariates for each country
  – **Second stage**: Use $k$ slopes of interest as dependent variables and regress them on the macro variables using weighted least squares (with or without robust standard errors); (Huber et al., 2005; Lewis and Linzer, 2005)
  – We applied a 2-step estimation, implemented through `edvreg.ado` in STATA (Lewis 2000 & Leoni 2006)
4. Results and Discussion
Descriptive Results: Variability of (very) bad health in Europe
Descriptive Results: Variability of leaking roof/dampness /rot
**Question 1 – a causal pathway?**

**Results**

<table>
<thead>
<tr>
<th></th>
<th>logitRob1</th>
<th>_felogit1</th>
<th>logitRob2</th>
<th>_logitRob3</th>
<th>_felogit2</th>
<th>_felogit3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equiv. disposable inc. (quintiles)</td>
<td>0.89***</td>
<td>0.97*</td>
<td>0.92***</td>
<td></td>
<td></td>
<td>0.97*</td>
</tr>
<tr>
<td>age</td>
<td>1.04***</td>
<td>0.86***</td>
<td>1.05***</td>
<td></td>
<td></td>
<td>0.86***</td>
</tr>
<tr>
<td>densely populated area</td>
<td>Ref. Cat</td>
<td>Ref. Cat</td>
<td>Ref. Cat</td>
<td></td>
<td>Ref. Cat</td>
<td></td>
</tr>
<tr>
<td>intermediate area</td>
<td>0.92***</td>
<td>0.45**</td>
<td></td>
<td>0.98</td>
<td></td>
<td>0.44**</td>
</tr>
<tr>
<td>thinly populated area</td>
<td>1.10***</td>
<td>0.61*</td>
<td></td>
<td>1.03*</td>
<td></td>
<td>0.58*</td>
</tr>
<tr>
<td>Rooms per equalised member</td>
<td></td>
<td></td>
<td></td>
<td>1.04***</td>
<td>0.75***</td>
<td>1</td>
</tr>
<tr>
<td>leaking roof/dampness /rot</td>
<td></td>
<td></td>
<td></td>
<td>1.58***</td>
<td>1.54***</td>
<td>1.28***</td>
</tr>
<tr>
<td>cannot afford to keep home warm</td>
<td></td>
<td></td>
<td></td>
<td>2.02***</td>
<td>1.65***</td>
<td>1.26***</td>
</tr>
<tr>
<td>No bath or shower in dwelling</td>
<td></td>
<td></td>
<td></td>
<td>1.34***</td>
<td>0.98</td>
<td>1.08</td>
</tr>
<tr>
<td>No Indoor flushing toilet</td>
<td></td>
<td></td>
<td></td>
<td>1.44***</td>
<td>1.21***</td>
<td>0.85*</td>
</tr>
<tr>
<td>HH does not have washing machine</td>
<td></td>
<td></td>
<td></td>
<td>1.89***</td>
<td>0.99</td>
<td>0.95</td>
</tr>
<tr>
<td>Xj (Controls)</td>
<td>Not displayed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N (persons)</td>
<td>685,348</td>
<td>81,239</td>
<td>729,504</td>
<td>683,221</td>
<td>89,072</td>
<td>80,921</td>
</tr>
<tr>
<td>MC-Fadden R²</td>
<td>0.257</td>
<td>0.014</td>
<td>0.03</td>
<td>0.277</td>
<td>0.004</td>
<td>0.018</td>
</tr>
</tbody>
</table>
Robustness Checks and Extensions: Question 1 – a causal pathway?

• Conducted:
  – LPM-Estimation
  – Two different additive housing deprivation indices (no. of problems) instead of separate items
    • Result:
      – Income Poverty instead of EPINC
      – Dynamic Panel Regression: lagged DV
      – Interaction Effects of housing deprivation with self-reported time spent at work (outside home)

• Next steps
  – Check for Attrition Bias and Measurement Error
  – Complex Sampling Issues
Question 2 – Results: effect heterogeneity across countries?

- Preliminary evidence for between country heterogeneity
  - Random-Intercept-Only-Model:
    - $Y_{ij} = \gamma + \mu_j + r_{ij}$
    - $\gamma$ ... Population mean
    - $\mu_j$ ... Permanent component for j (country)
    - $r_{ij}$ ... Idiosyncratic component (specific for each observation $y_{ijk}$)
    - $\text{Var}(\mu_j)/\text{Var}(y_{ij}) = \text{ICC}$: a maximum of around 10% of the variation in subjective health can be explained by country differences (2005: 10.2; 2006: 10; 2007: 10.3; 2008: 10.6)
Question 2 – Results: effect heterogeneity across countries?

Damp/rot, logit

Inab. to keep home warm, logit

Damp/rot, FE logit

Inab. to keep home warm, FE logit
## Question 2 – 2\textsuperscript{nd} step Results

<table>
<thead>
<tr>
<th>WLS estimates (robust) ratios (*p&lt;0.1; **p&lt;0.05; ***p&lt;0.01)</th>
<th>Logit: (b(\text{hh040}))</th>
<th>Logit: (b(\text{hh050}))</th>
<th>Logit: (b(\text{wohndep rivation1}))</th>
<th>FE Logit: (b(\text{hh040}))</th>
<th>FE Logit: (b(\text{hh050}))</th>
<th>FE Logit: (b(\text{wohndep rivation1}))</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Separate model:</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soc. Spending: Health, pps/per capita, (\varnothing) 05-08</td>
<td>-0.003994, 0.0002258** , 0.0001137*</td>
<td>-0.0000637</td>
<td>0.000078, 0.000314</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soc. Spending: Housing, pps/per capita, (\varnothing) 05-08</td>
<td>0.0000139, -0.0003746, -0.0002282</td>
<td>0.0000768, 0.0002567</td>
<td>-0.000119</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N) (countries)/R2</td>
<td>20/0.07, 20/0.46, 20/0.53</td>
<td>20/0.08, 20/0.11, 20/0.05</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Separate model:</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Gini, (\varnothing) 05-08</td>
<td>-0.0031895, -0.0122469, -0.015***</td>
<td>0.0044671, -0.001276, -0.0034029</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N) (countries)/R2</td>
<td>21/0.01, 21/0.05, 21/0.23</td>
<td>21/0.01, 21/&lt;0.01, 21/0.02</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Conclusions

• Question 1
  – living in a dwelling with leaking roofs, damp walls or rot and limited means to keep the home warm significantly increases the likelihood of reporting a bad/very bad health status.
  – Interaction effects: effect of bad housing on the odds for health is smaller for persons spending more time outside their home (preliminary evidence)
• Question 2
  – share of people reporting a bad or very bad health status varies considerably between 22% (Lithuania) and 3% (Ireland)
  – significant effect of unobservable country fixed effects on self-reported health
  – around 10% of the variability in the dependent variable can be attributed to country specific factors
  – Mixed evidence concerning effect of policy variables (Gini) on slope heterogeneity
Thank you for your attention !!!