From a conservative to a liberal welfare state: decomposing changes in income-related health inequalities in Germany, 1994–2011

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Motivation: welfare states, health, and health inequalities

- inverse relation between socio-economic status and health
- individual factors account for large parts
- welfare states mediate associations between socio-economic status and health
- welfare state retrenchments may foster inequality
- welfare state arrangements and health inequalities: two potential pathways:
  1. may affect influence of determinants of health and health
  2. determine distributions of determinants of health within a society
Germany’s welfare state before the 1997/98 reforms

- entitlement criteria based on duration of employment
- benefits determined by wage-dependent contributions to unemployment insurance
- job offers were considered unsuitable if field of occupation or salary were inferior to former occupation
- those not entitled received basic, means-tested social benefits
The liberalization of Germany’s welfare state

- the 1997/8 reform
  - limited definition of suitable employment to wage threshold (decreasing over time)
  - relaxation of labor market regulations (fixed term and minor employment)
  - relaxation of labor market restrictions (minor, fixed term and precarious employment)
  - reduction of unemployment allowances
  - combination of long term unemployment benefits with social benefits to a basic, means-tested benefit
Research questions

1. How did income-related inequalities in self-assessed health evolve over time?
2. How did the contributions of the social determinants of health evolve over time?
3. How can these changes – if any – be explained?
4. Are there considerable temporal coincidences with the welfare reforms?
Data: Socio-economic Panel (1994-2011)

- data from Socio-economic Panel (SOEP v28)
- response rate ≈ 60%
- repeated cross-sectional data for 1994-2011
- only individuals between 25 and 60

Means of explanatory variables

- sex (female)
- age
- income
- higher education
- lower education
- unemployment
- irregular employment
- non-working
- East

(annual estimates)
Prevalence and inequality of unsatisfactory health

- concentration index $C = \frac{2}{n\mu} \sum_{i=1}^{n} y_i r_i - 1$
- measures twice the area between concentration curve and line of equality
- $C \in (-1; 1)$
- $C < 0 \Rightarrow$ concentration of $y$ among the worse-off
- $C > 0 \Rightarrow$ concentration of $y$ among the better-off
- the higher $|C|$, the more inequality
- income-related inequalities in unsatisfactory health doubled over time

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Explaining health inequalities: decomposition of the concentration index

- $y$ is binary $\Rightarrow$ Probit model: $y = G(\beta_0 + \sum_k \beta_k x_k + \epsilon)$
- approximate elasticities $\tilde{\eta}_k = \frac{\tilde{\beta}_k \bar{x}_k}{\mu}$ via partial effects $\tilde{\beta}_k = \frac{\partial G(\cdot)}{\partial x_k} \bigg| \bar{x}_k$
- decomposition of concentration index $C$:
  $$C = \frac{2}{n\mu} \sum_i y_i r_i - 1 \approx \sum_k \frac{\tilde{\beta}_k \bar{x}_k}{\mu} C_k + \frac{GC\epsilon}{\mu}$$
- the contributions $\frac{\tilde{\beta}_k \bar{x}_k}{\mu} C_k$ indicate how $C$ would differ if
  - $x_k$ was unrelated with health: $\tilde{\beta}_k = 0$
  - $x_k$ was equally distributed across income groups: $C_k = 0$
Decomposition results: summarized contributions

- **negative contributions**: a factor “draws” prevalence towards the poor
- **positive contributions**: a factor “draws” prevalence towards the rich
- socio-economic determinants of health contribute to inequalities
- age, sex and East mediate inequalities
- decreasing unexplained part: model accuracy improved (socio-economic factors became better predictors over time)

**contributions to health inequalities**

(annual estimates)

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Contributions to change 1994–2011 (summarized)

- income, education and employment status explain most of the change
- East mediated health gradient only in the first years
- age and sex contribute only little
- unexplained part suggests that model would predict stronger change of C
Changes in associations or changes in distributions?

- change in the concentration indices $\Delta C = C_t - C_{t-1}$ can be decomposed into the sum of the changes in the factor contributions
- total differential approach:

$$dC = -\frac{C}{\mu} d\tilde{\beta}_0 + \frac{\bar{x}_k}{\mu} \sum_k (C_k - C) d\tilde{\beta}_k + \frac{\tilde{\beta}_k}{\mu} \sum_k (C_k - C) d\bar{x}_k$$

$$+ \sum_k \frac{\tilde{\beta}_k \bar{x}_k}{\mu} dC_k + \frac{dGC_\epsilon}{\mu}$$

- further decompose $\Delta C$ into
  - factor level effect: change of $C_y$ numerically induced by change of $\bar{x}_k$
  - coefficient effect: change of $C_y$ numerically induced by change of $\tilde{\beta}_k$
  - distribution effect: change of $C_y$ numerically induced by change of $C_k$
Decomposition of changes in factor contributions

- **distribution effects**: income, lower education, unemployment, irregular employment and non-working increased inequalities ($C_k \uparrow$); age, East ($C_k \downarrow$)
- **factor level effects**: decreased unemployment rate and share of lower educated and non-working individuals mediated change of $C$
- **coefficient effects**: stronger associations of income, non-working and unemployment with health

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Income-related distribution of explanatory variables

- relative income position of unemployed, lower educated and irregularly employed decreased
- income inequality increased slightly
- higher educated are slightly better-off

(annual estimates)
Answers to the research questions

1. How did income-related inequalities in self-assessed health evolve over time?
   - no considerable change in the prevalence
   - income-related inequalities in unsatisfactory health roughly doubled

2. How did the contributions of the social determinants of health evolve over time?
   - contributions of income and unemployment increased
   - living in East Germany contributed only in the first years
Answers to the research questions

3 How can these changes – if any – be explained?
- associations changed only little
- prevalences changed to some extent but had only little impact on the contributions
- changes in contributions are largely attributable to income-related redistributions of social determinants of health

4 Are there considerable temporal coincidences with the welfare reforms?
- no considerable changes are observed around the 1998 reforms
- considerable changes are observed between 2005 and 2008 (i.e. after the Hartz reforms)
Thank you for your attention!