The Heights of Medical Care: Health Insurance and Inequality in Adult Stature

Joerg Baten, University of Tübingen
Alberto Batinti, University of Rome La Sapienza
Joan-Costa Font, LSE
Laura Radatz, University of Tübingen

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Inequality

Individual health

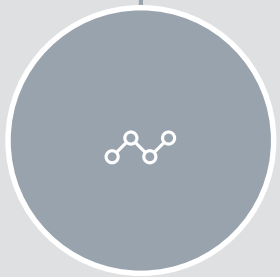
e.g., Currie, 2011; Deaton, 2002, 2003; Kawachi et al., 1997; Singu et al., 2020.

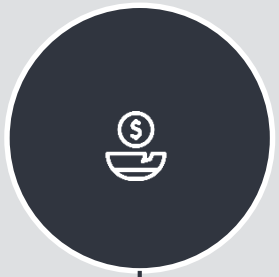
Social cohesion

e.g., Alesina et al., 2016; Kabeer, 2010; UNDP, 2013; Vergolini, 2011.

Economic growth (in the long-run)

e.g., Banerjee & Duflo, 2003; Castell´o-Climent, 2010; Deininger & Squire, 1998; Ostry et al., 2014; Stiglitz, 2012.





Poverty

e.g., Banerjee and Duflo, 2011; Bergstrom, 2022; Besley and Burgess, 2003; Ferreira et al., 2008; Fosu, 2017; Ravallion, 2005.

Violent conflict

e.g., Acemoglu and Robinson, 2006; Baten and Mumme, 2013; Jensen and Sørensen, 2012; Vergolini, 2011.

Motivation

Unequal access to and the quality of the healthcare and school systems are seen as key causes of inequality (UN-ESCAP, 2018).

Does health insurance expansion can be linked to lower levels of inequalities in the following decades?

Data and Methodology

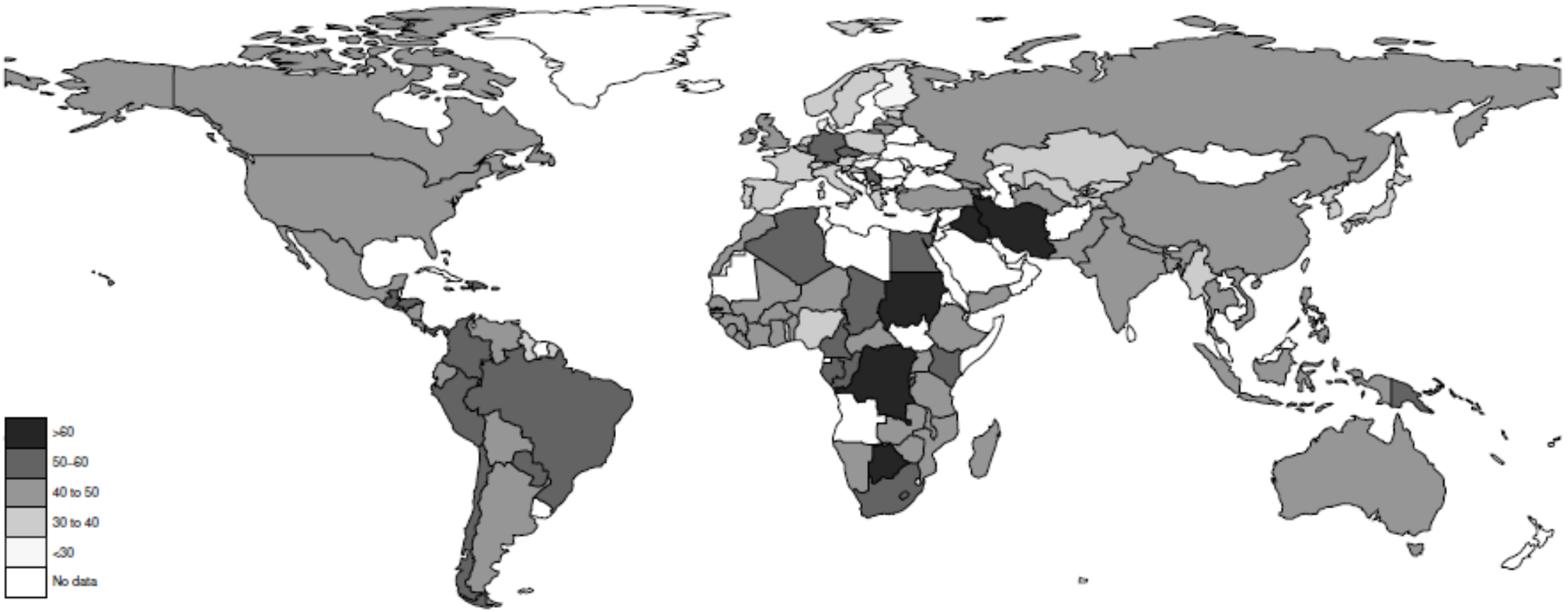
Height inequality

- Height reflects the so-called ‘biological standards of living’ (Steckel, 1995; Komlos, 1985)
- Final height of an adult is determined by circumstances experiences as child.
- Height distribution reflects general inequality in a country
- **Data source:** Baten and Blum, 2011, e.g., DHS and individual sources.

Measuring health insurance expansion

- Universal Health Coverage (UHC)
- Dummy variable for the legal introduction and implementation of UHC
- **Data source**: manually collected

Sample
Height inequality worldwide (most recent data available)



Data source: Based on Baten and Blum, 2011; extended by Radatz and Baten, 2022.

Data and Methodology

OLS estimation

$$Height\ Inequality_{it} = \beta_0 + \beta_1 UHC_{it} + \gamma Z_{it} + \tau_t + \mu_j + \varepsilon_{it}$$

- Z_{it} is a vector of control variables, capturing country characteristics
- τ_t time-fixed effects
- μ_j world region-fixed effects

Instrumental Variable (IV) approach

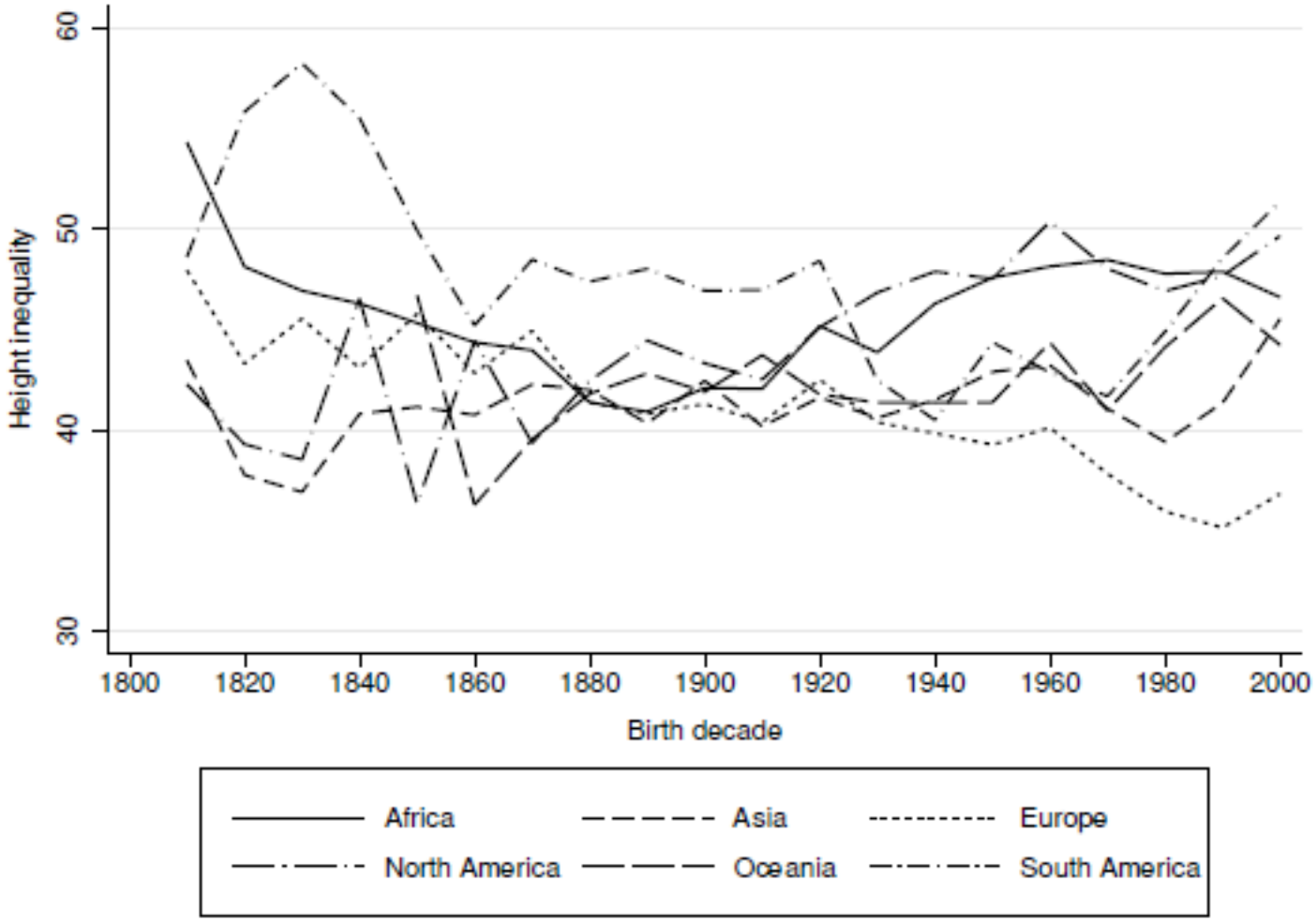
First stage:

$$UHC_{it} = \beta_1 + \beta_2 DistanceSovietUnion_i + \beta X_i + \varepsilon_{it}$$

- $DistanceSovietUnion_i$ cross-sectional spatial instrumental variable
- X_i is a vector of other exogenous variables

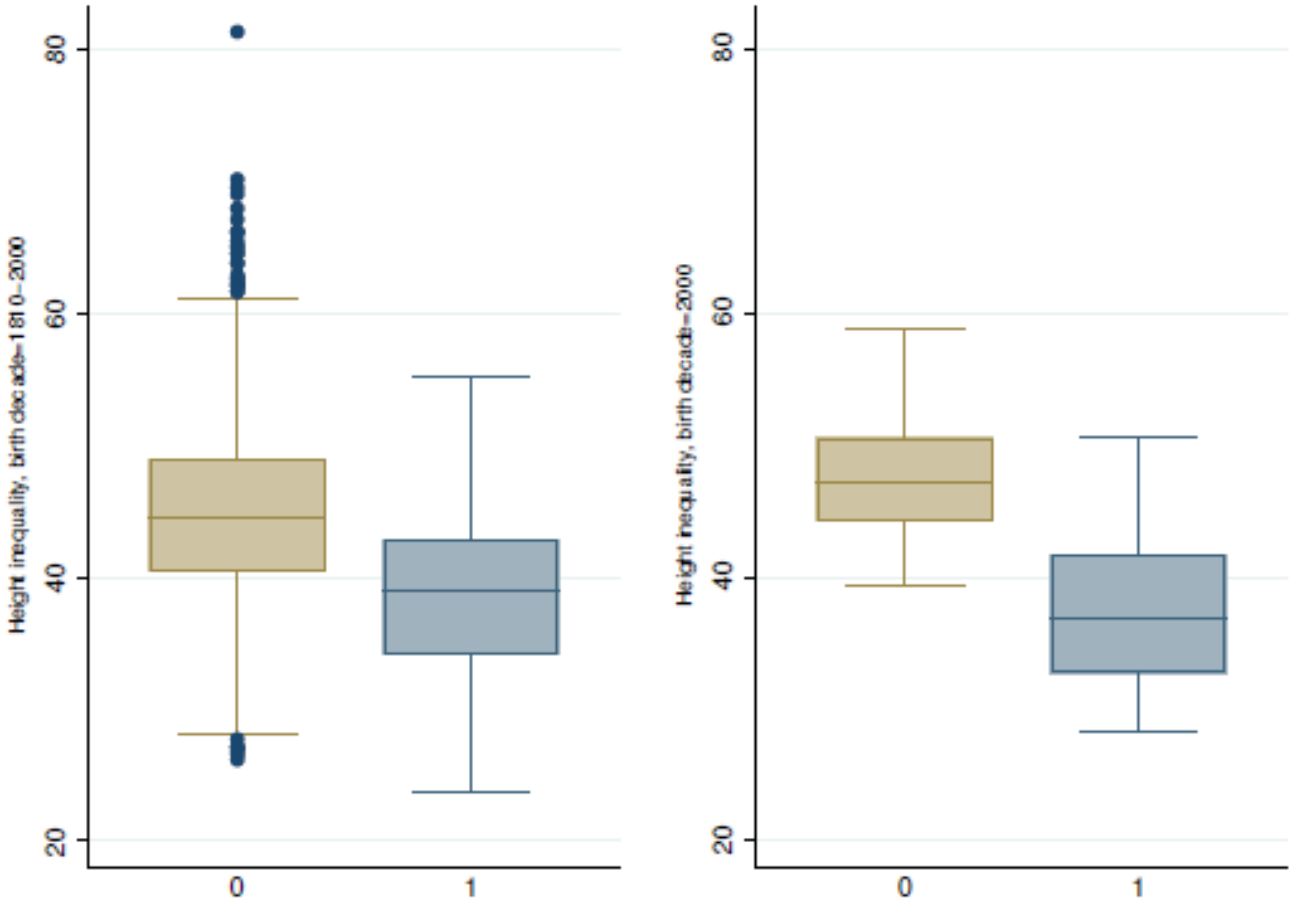
Descriptive Statistics

Development of height inequality over time by world region



Descriptive Statistics

Differences in height inequality by Universal Health Coverage (=1)



Regression Results
OLS estimation

	(1) Height Gini	(2) Height Gini	(3) Height Gini	(4) Height Gini	(5) Height Gini	(6) Height Gini
UHC	−4.73***	−4.66***	−4.93***	−3.86**	−3.56**	−5.35***
	(1.158)	(1.159)	(1.296)	(1.502)	(1.556)	(1.394)
Population (log)		0.23	0.20	−0.07	−0.22	−0.59
		(0.287)	(0.281)	(0.352)	(0.432)	(0.427)
Urbanisation			4.50	9.86***	10.02**	9.84**
			(2.951)	(3.697)	(3.972)	(4.090)
GDP per capita (log)				−1.90**	−1.92**	−2.15**
				(0.746)	(0.865)	(0.955)
Democracy					−0.06	−0.03
					(0.089)	(0.092)
Democracy^2					−0.30	−0.74
					(1.298)	(1.284)
Constant	51.63***	48.23***	48.68***	67.74***	69.73***	74.90***
	(1.960)	(4.693)	(4.596)	(6.886)	(8.593)	(9.214)
Observations	1191	1183	1176	857	722	722
R-squared	0.188	0.190	0.188	0.227	0.226	0.192
Time Fixed Effects	Y	Y	Y	Y	Y	Y
Region Fixed Effects	Y	Y	Y	Y	Y	N

Instrumental variable approach
Determinants of height inequality

	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
First stage					
DistSovietUnion	−0.22***	−0.22***	−0.20***	−0.24***	−0.27***
	(0.021)	(0.023)	(0.021)	(0.027)	(0.029)
Second stage					
UHC	−24.11***	−26.58***	−28.63***	−25.49***	−22.37***
	(2.665)	(3.157)	(3.628)	(3.646)	(3.185)
Population (log)		0.47**	0.16	−0.19	−0.49**
		(0.220)	(0.192)	(0.204)	(0.214)
Urbanisation			24.82***	13.08***	13.72***
			(4.509)	(3.180)	(3.305)
GDP per capita (log)				2.28**	0.95
				(0.948)	(0.855)
Democracy					0.07
					(0.076)
Democracy^2					1.55
					(1.189)
Observations	1191	1183	1176	857	722
Adj. R-squared	0.178	0.176	0.369	0.472	0.509
Time Fixed Effects	Y	Y	Y	Y	Y
Region Fixed Effects	N	N	N	N	N
F-statistic	109.90	91.43	87.91	76.97	81.10
Kleinbergen-Paap rk LM statistic	Exactly identified				
Hansen J statistic	Exactly identified				

Notes. Robust standard errors in parentheses, ***, **, *, significant on the 1, 5, and 10%-level, respectively. The dependent variable in the first stage is UHC and height inequality in the second stage. UHC is coded as one if a country achieved UHC, indicating the years after the first implementation, zero otherwise. We take the natural logarithm for the variables DistSovietUnion, Population and GDP per capita. For interpretation, we divided DistSovietUnion by 1,000 before running the regression.

Concluding Remarks

New evidence

through the construction of a large and consistent dataset on inequality by the usage of anthropological measures

Results

With the expansion of health insurance, we observe a positive and substantial reduction in a country's level of height inequality

Policy implications

Reforms that reduce financial barriers to accessing health care can have a significant impact on reducing disparities in health, a call for the adaptation of appropriate social policies. This could be achieved by:

- Promoting health coverage for the whole population
- Investments in the health system

THANK YOU FOR YOUR ATTENTION!

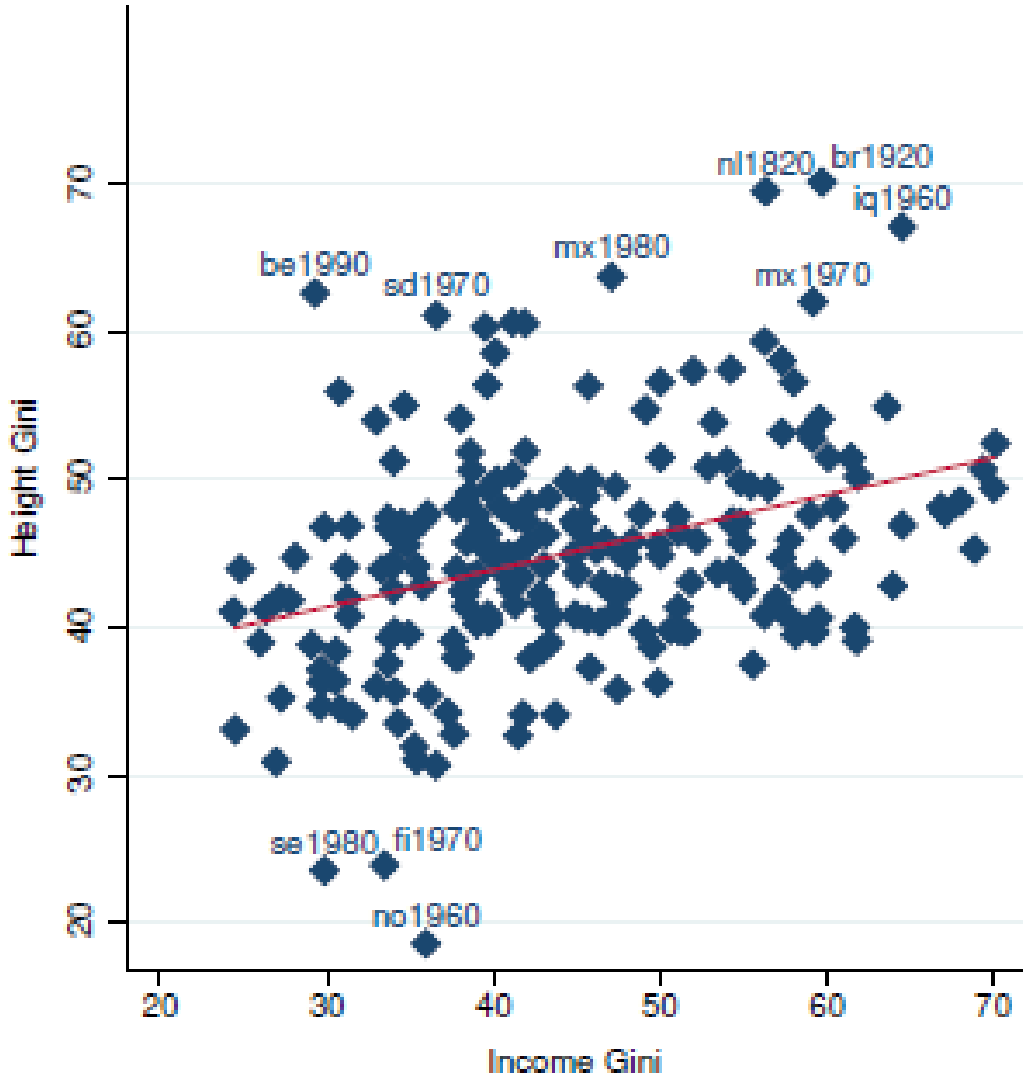
Contact

Laura Radatz

University of Tuebingen

Laura.radatz@uni-tuebingen.de

Relationship between height Gini and income Gini



Notes. Data for income Ginis are derived from van Zanden et al. (2014). Labels refer to the country-decade combination.

OLS regression including controls: correlates of height inequality

	(1) Height Gini	(2) Height Gini	(3) Height Gini	(4) Height Gini	(5) Height Gini	(6) Height Gini
UHC	−4.73***	−4.66***	−4.93***	−3.86**	−3.56**	−5.35***
	(1.158)	(1.159)	(1.296)	(1.502)	(1.556)	(1.394)
Population (log)		0.23	0.20	−0.07	−0.22	−0.59
		(0.287)	(0.281)	(0.352)	(0.432)	(0.427)
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GDP per capita (log)				−1.90**	−1.92**	−2.15**
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Democracy					−0.06	−0.03
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Democracy^2					−0.30	−0.74
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Constant	51.63***	48.23***	48.68***	67.74***	69.73***	74.90***
	(1.960)	(4.693)	(4.596)	(6.886)	(8.593)	(9.214)
Observations	1191	1183	1176	857	722	722
R-squared	0.188	0.190	0.188	0.227	0.226	0.192
Time Fixed Effects	Y	Y	Y	Y	Y	Y
Region Fixed Effects	Y	Y	Y	Y	Y	N

Notes. Country-clustered robust standard errors in parentheses, ***, **, *, significant on the 1, 5, and 10%-level, respectively. The dependent variable is height inequality in every model. UHC is coded as one if a country achieved UHC, indicating the years after the first implementation, zero otherwise. For interpretation, GDP per capita is divided by 1,000 before running the regression. Marginal effects reported.

Instrumental variable approach

Table D.5: Correlation between height inequality and the distance to the Soviet Union

	(1) Height Gini	(2) Height Gini
	Omitted Birth decades >=1880	*Omitted Birth decades <1880*
DistSovietUnion	5.83	6.32***
	(4.322)	(1.444)
Constant	53.01***	47.44***
	(2.918)	(1.249)
Observations	185	1006
R-squared	0.134	0.218
Time Fixed Effects	Y	Y
Region Fixed Effects	Y	Y

Notes. Robust standard errors in parentheses, ***, **, *, significant on the 1, 5, and 10%-level, respectively. The dependent variable is height inequality. We take the natural logarithm of *DistSovietUnion* and divided it by 1,000 before running the regression.

Overview and Sources for health insurance legislation

- Australia au 1970 Cutler and Johnson (2002)
- Austria at 1890 Cutler and Johnson (2002)
- Belgium be 1940 Cutler and Johnson (2002)
- Canada ca 1970 Cutler and Johnson (2002)
- Chile cl 1980 SSA (2020)
- Colombia co 1960 SSA (2020)
- Costa Rica cr 1940 SSA (2020)
- Czech Republic cz 1890 SSA (2018)
- Denmark dk 1930 Cutler and Johnson (2002)
- Estonia ee 1920 SSA (2018)
- Finland fi 1960 Cutler and Johnson (2002)
- France fr 1930 Cutler and Johnson (2002)
- Germany de 1880 Cutler and Johnson (2002)
- Greece gr 1920 SSA (2018)
- Guyana gy 1970 SSA (2020)
- Hungary hu 1890 SSA (2018)
- Iceland* is 1940 SSA (2018)
- Ireland ie 1910 SSA (2018)
- Israel il 1950 Rosen et al. (2015)
- Italy it 1940 Cutler and Johnson (2002)
- Japan jp 1930 Cutler and Johnson (2002)
- Kazakhstan kz 1910 Goudima and Rybalko (1996)
- Latvia lv 1920 SSA (2018)
- Lithuania lt 1990 WHO et al. (2013)
- Luxembourg* lu 1900 SSA (2018)
- Netherlands nl 1940 Cutler and Johnson (2002)
- New Zealand* nz 1940 Cutler and Johnson (2002)
- Norway no 1910 Cutler and Johnson (2002)
- Poland pl 1920 SSA (2018)
- Portugal pt 1930 Cutler and Johnson (2002)
- Romania* ro 1930 SSA (2018)
- Russia ru 1910 Goudima and Rybalko (1996)
- Singapore* sg 1950 SSA (2019)
- Slovakia sk 1990 SSA (2018)
- Slovenia si 1920 SSA (2018)
- South Korea kr 1980 SSA (2019)
- Spain es 1940 Cutler and Johnson (2002)
- Sweden se 1930 SSA (2018)
- Switzerland ch 1990 Cutler and Johnson (2002)
- Taiwan tw 1950 SSA (2018)
- Turkey tr 1950 SSA (2018)
- United Kingdom uk 1910 Cutler and Johnson (2002)
- Uruguay uy 1970 SSA (2020)

Notes. Countries marked with a star $*$ are not included in the regression analysis due to missing data for height Gini.