Regional Housing Costs and the Relationship between Material Deprivation and Poverty in the EU

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Stefano Filauro & Zachary Parolin

(ERC ExpPov n. 101039655)

Bocconi

Outline

Geographic variation in **housing costs** and its implications for our understanding of **poverty**.

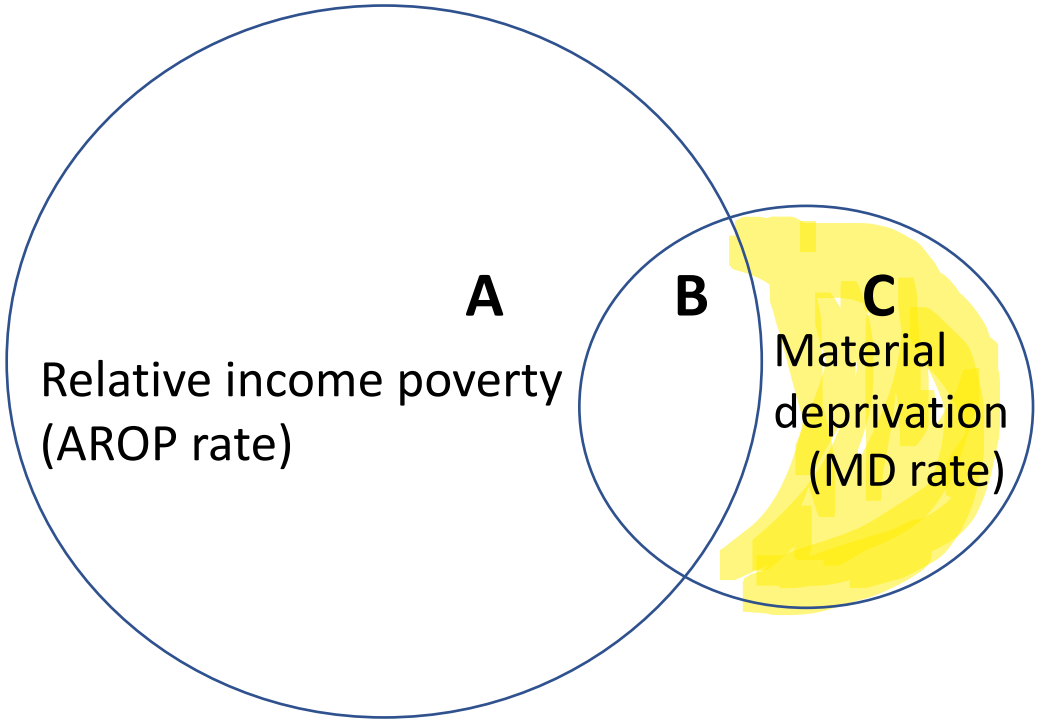
- Analysis of overlap between relative poverty and deprivation in the EU
- Within-country trends in the overlap attributable to housing costs
- Individual mechanisms responsible for within-country trends about the overlap between poverty measures
- Implications for policy

Research questions and preview of results

- To what extent does the discordance between relative poverty and material deprivation depend on housing costs?
- Is the discordance greater in high-income regions due to larger housing costs faced by households at similar income levels nation-wide?
- What differences can be traced across countries, especially in countries with secular territorial disparities?

- Housing status varies markedly across population subgroups (tenants disproportionately prevalent among income-poor and especially materially deprived households; mortgage holders are more represented in the non-poor materially deprived group).
- Regions characterised by more burdensome housing costs tend to have lower overlap between material deprivation and income poverty.
- Housing costs are a moderating factor between the two poverty measures and may push households in deprivation despite income levels above the poverty line.

Current EU poverty framework



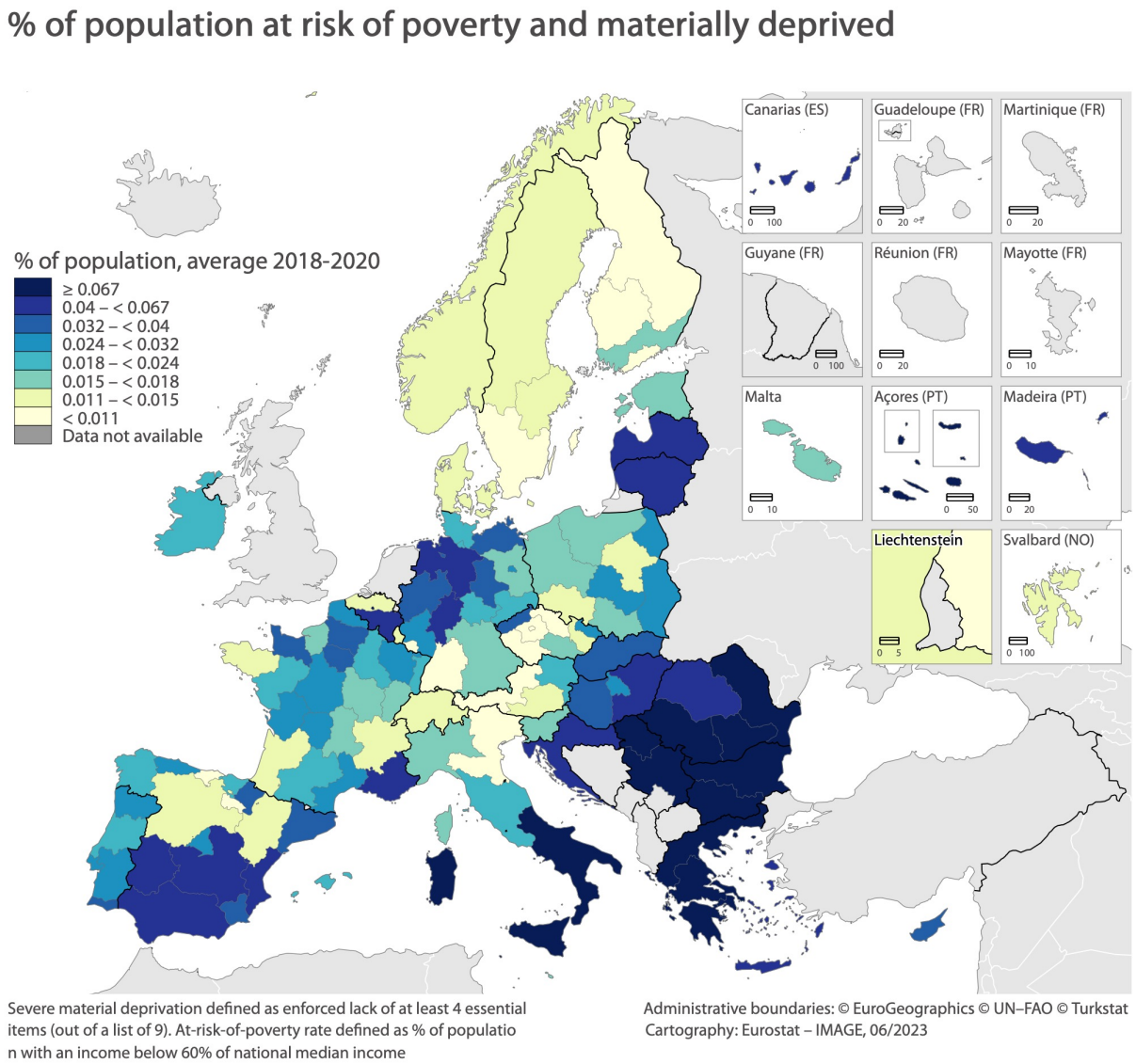
Relative (AROP) and absolute poverty (SMD).
The two measures overlap.
B: absolute overlap (AO)
B/(B+C): relative overlap (RO = [0;1])

RO closer to zero >> greater discordance: more deprived households are not income poor.

Absolute poverty underestimated with a relative measure >> Serious limitation for the measure of relative income poverty (AROP rate) as the prevalent poverty monitoring tool with policy implications.

Respective populations by tenancy status..

Absolute overlap: proportion of income-poor & materially deprived population (B)



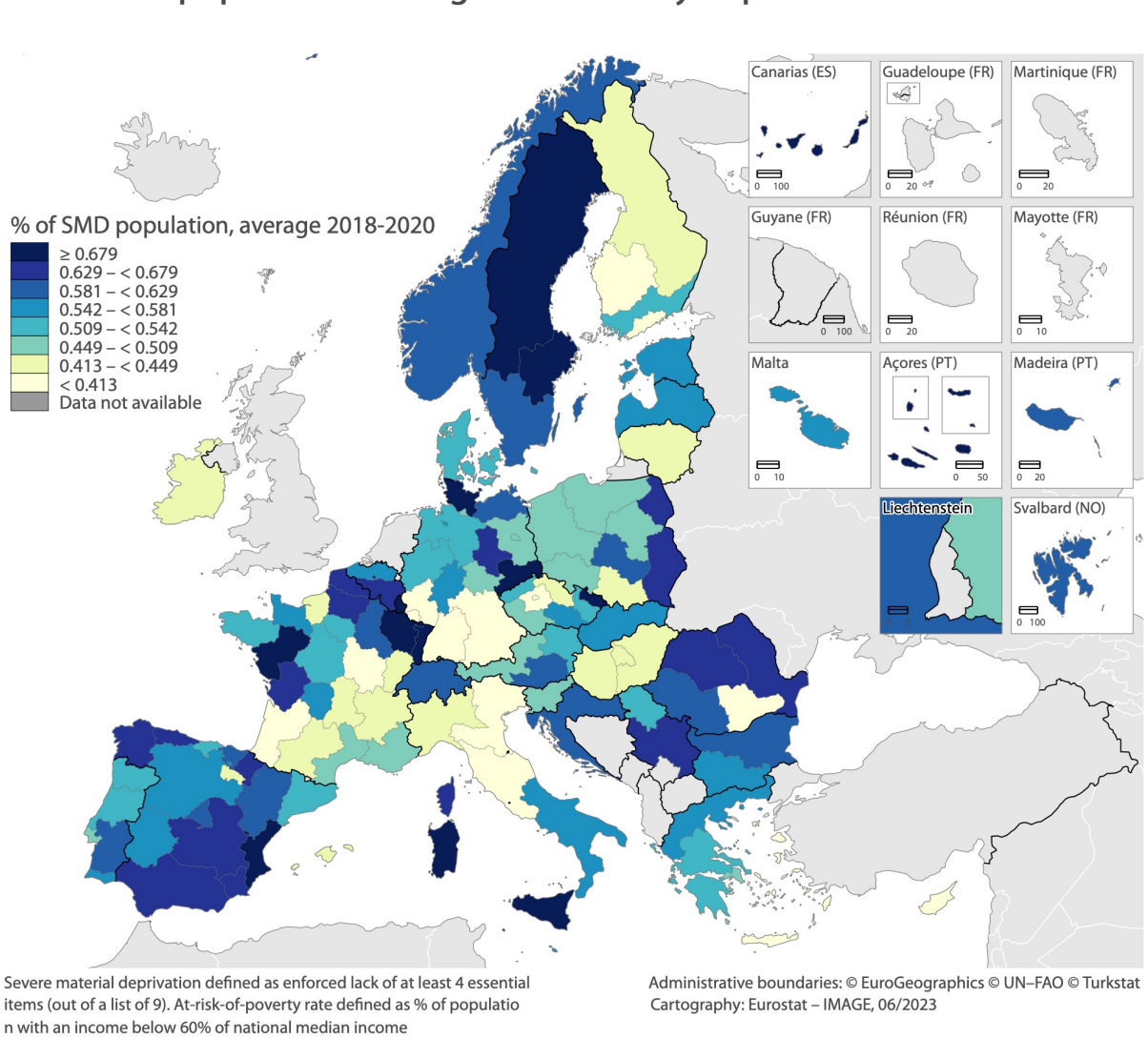
Traditional North-South divide.

- Nordic countries with low proportions of materially deprived and income poor population (< 1.5%), and Southeastern countries with large proportions of population in both conditions (> 6%).

- Large heterogeneity within countries especially in large countries with secular territorial disparities (France, Italy, Germany, Spain and Poland)

And the relative overlap (or lack thereof)?

Relative overlap: proportion of income-poor & materially deprived in relative terms (B/(B+C))



- Previous results do not apply for relative overlap - B/(B+C)
- No traditional clusters
  - Sweden and Norway have large proportions of their (relatively low) SMD population that is income-poor as well as Romania and Spain.
  - Conversely, Finland, Ireland, Hungary have low proportions of their SMD population that are also income poor.
- Within-country: richer regions have lower relative overlap (Northern Italy and Southern Germany).

Thus, we hypothesise (H1) that the richer the region, the higher the fraction of the deprived population who is not income poor. Higher housing costs in richer regions?

Hypotheses

- H1: at regional level the richer the region, the higher the average housing costs*, the lower the overlap (low proportion of materially deprived population in relative poverty)

- H2: at individual level housing costs are a moderating factor between material deprivation and income poverty (H2) and higher housing costs reduce their positive association (more households are deprived despite decent income level).

*Housing costs include mortgages, rents, utility bills, maintenance and renovation work

Methods

- Compare housing costs across regions (1)
- $\log(Housing\ costs)_{irt} = \beta_0 + \beta_k \boldsymbol{X}_{irt} + \gamma_R RegionFE + u_{ir}$
- Test the overlap is lower in high housing-cost regions (2)
- $Relative\ overlap_{rt} = \alpha + \beta \log(\widehat{Housing\ costs})_{rt} + countryFE + yearFE + \varepsilon_{rt}$
- Test the moderating role of housing costs (3)
- $md_{ict} = \alpha + \beta_1 logHC_{ict} + \beta_2 pov_{ict} + \beta_3 pov * logHC_{ict} + \beta_k \boldsymbol{X}_{ict} + CountryFE + YearFE + \varepsilon_{ict}$
- Test the moderating role of housing costs (4)
- $z_{ict} = \alpha + \beta_1 logHousingCosts_{ict} + \beta_k \boldsymbol{X}_{ict} + CountryFE + \mathrm{YearFE} + \varepsilon_{ict}$

- z = 1 if household is materially deprived & NOT AROP; = 0 if materially deprived & AROP

Results

Regression output (2): relative overlap between md and AROP over housing costs or income, regions, 2013 to 2020. β 100*

	(1)	(2)	(3)
	mod1	mod2	mod3
housing costs	-0.0298**		
	(-3.15)		
median income		-0.00193***	
		(-7.53)	
median post-housing income			-0.00363***
			(-7.71)
N	890	917	917
adj. R^2	0.206	0.244	0.246

Output of a linear regression absorbing multiple levels of fixed effects. Country and time fixed effects not shown. Dependent variable: proportion of materially deprived population in income poverty.

- β on the quality-adjusted regional housing costs negative and significant

↓

- Lower overlap as housing costs become heavier

Housing costs more powerful to explain lower overlap than region's median income (mod2) or post-housing costs median income (mod3), despite large correlation between housing costs and income levels at reg level.

H1 confirmed: the % of population who is materially deprived despite a decent income level is larger in higher-cost region (than in lower-cost ones), controlling for country FE

Probit model output (3). Dependent variable = material deprivation

	(1)	(2)	(3)	(4)
income-poor X logHC	-0.014***			
	(-218.40)			
income-poor X logHCeq		-0.024***		
		(-385.70)		
income-poor X logHCppp			0.003***	
			(36.44)	
income-poor X logHCeqppp				-0.012***
				(-162.08)
logHC	-0.186***			
	(-2952.2)			
logHCeq		-0.145***		
		(-2337.95)		
logHCppp			-0.193***	
			(-2978.17)	
logHCeqppp				-0.151***
				(-2358.15)
income-poor	0.901***	0.952***	0.805***	0.895***
	(2420.77)	(3048.99)	(1768.40)	(2344.56)
household size	0.020***	-0.014***	0.020***	-0.014***
	(971.58)	(-659.01)	(977.01)	(-654.79)
mortgage-holder	0.115***	0.101***	0.117***	0.103***
	(1102.71)	(965.53)	(1120.09)	(980.05)
tenant	0.834***	0.811***	0.834***	0.811***
	(8336.62)	(8026.70)	(8339.69)	(8030.89)
tenant reduced	0.667***	0.666***	0.667***	0.666***
	(7228.57)	(7195.84)	(7231.46)	(7197.32)
Female	0.135***	0.136***	0.135***	0.136***
	(2200.51)	(2211.58)	(2196.45)	(2207.29)
disability	0.435***	0.432***	0.435***	0.432***
	(5593.83)	(5555.38)	(5586.61)	(5547.64)
old-age	-0.192***	-0.173***	-0.192***	-0.172***
	(-1825.36)	(-1653.90)	(-1824.37)	(-1646.46)
Pseudo R^2	0.220	0.218	0.220	0.218

- The coefficient β_3 on the interaction term between income poverty and housing costs is generally negative and significant.
- H2 confirmed: the positive association between material deprivation and income poverty gets weakened as housing costs rise
- Estimates from the probit model: AROP hhs are 13.4 pp more likely to be materially deprived than non-AROP at the 25th percentile of the housing costs distribution. This association diminishes for larger housing costs: 11.3 pp and 9.6 pp at the median and the 75th pct of housing costs, keeping the other covariates at their means.

Country and time fixed effect not shown. Years = 2013 to 2020. Key covariates: (log)housing costs (1); (log)housing costs equivalised (OECD-modified) (3); (log)housing costs in ppp (2); (log)housing costs equivalised (OECD-modified) in ppp (4)

Probit model output (4). Dependent variable: poor materially deprived (=1) vs non-poor materially deprived (=0).

	(1)	(2)	(3)	(4)
	mod1	mod2	mod3	mod4
Dependent variable = 0 if non-poor md; =1 if poor md				
logHC	0.567***			
	(4553.93)			
logHCeq		0.515***		
		(4143.31)		
logHCppp			0.567***	
			(4556.69)	
logHCeqppp				0.515***
				(4145.70)
household size	-0.093***	0.007***	-0.093***	0.007***
	(-2379.64)	(160.72)	(-2379.23)	(162.43)
mortgage-holder	0.130***	0.156***	0.129***	0.156***
	(477.24)	(578.11)	(474.87)	(576.04)
tenant	-0.541***	-0.519***	-0.541***	-0.519***
	(-2430.48)	(-2317.74)	(-2430.81)	(-2317.91)
tenant reduced	-0.363***	-0.365***	-0.362***	-0.365***
	(-1779.10)	(-1795.58)	(-1778.09)	(-1794.65)
Female	0.016***	0.020***	0.016***	0.020***
	(118.74)	(149.74)	(118.05)	(149.10)
disability	0.057***	0.069***	0.057***	0.069***
	(356.95)	(436.21)	(361.18)	(440.02)
old-age	0.219***	0.141***	0.220***	0.141***
	(899.43)	(580.88)	(900.67)	(581.88)
Pseudo R^2	0.075	0.068	0.075	0.068

- β_1 as a driver into the status of non-poor materially deprived as opposed to poor and materially deprived
- The average marginal effect of an increase in housing costs on the probability to be non-poor and materially deprived is positive and significant at the means of the other control variables in 2020.
- On average across EU countries, an increase of 1 in the log of housing costs is associated with an increase of 19% in the probability of being non-poor materially deprived, as opposed to poor and deprived.

Country and time fixed effect not shown. Years = 2013 to 2020. Key covariates: (log)housing costs (1); (log)housing costs equivalised (OECD-modified) (3); (log)housing costs in ppp (2); (log)housing costs equivalised (OECD-modified) in ppp (4)

Conclusions

Overall framework: Bringing housing costs into traditional welfare studies (Stephens & Hick 2022) and corroborating studies on the role of redistributive housing policies at national level (Dewilde 2022).

Evidence: Absolute overlap more concentrated in poorer EU countries and highly variable in countries with large regional disparities. Relative overlap has a peculiar geographic distribution. Hypothesis: does it depend on housing costs?

- H1: the heavier the housing costs the lower the overlap at regional level
- H2: the probability to be materially deprived is positively associated with income poverty but the effect is weakened as housing costs rise. Despite a decent income level, hhs may be forced to cut necessities due to heavy expenses

Policy implications

- Relative poverty measures (AROP) less fit to capture hardship in high-cost regions, especially in times of rising costs.
- Social transfers schemes should consider housing costs in their eligibility criteria and in the evaluation of policy effectiveness. Within-country effects should also be considered in the policy design

Limitations

Regions as geographic level of analysis.Geographic trends may differ over time (rural urban), rising costs differ within urban areas

Distinction between the different components of housing costs (mortgages, rents and utility bills)

Thank you

- Comments
- Criticisms
- Suggestions

- Contact: Stefano.filauro2@unibocconi.it

Extra slides

Housing tenancy status, poor vs non-poor

- Tenants are disproportionately represented among the poor (Eurofound 2023).

- In turn, tenants are more represented among the md than the AROP population (also tenants at below-market rents)

Tenancy status, pp difference between AROP and total population, EU 2020

owner	mortgage	tenant	tenant reduced	free
-4%	-15%	10%	5%	3%

Note: the % of tenants in the AROP population in the EU is 10 pp higher than the % of tenants in the total population.

Tenancy status, pp difference between SMD and total population, EU 2020

owner	mortgage	tenant	tenant reduced	free
-13%	-17%	19%	9%	2%

Note: the % of tenants in the SMD population in the EU is 19 pp higher than the % of tenants in the total population.

Poor and SMD, different housing status

- The non-deprived poor (A) vs poor (A+B)

Tenancy status, pp difference between non-deprived poor (C) and poor, EU 2020

owner	mortgage	tenant	tenant reduced	free
2.4%	0.9%	-2.0%	-1.1%	-0.2%

the % of owners in the non-deprived AROP population in the EU is 2.4 pp higher than the % of owners in the total AROP population

more owners among the non-smd AROP than just AROP (basically low-income hh), a bit more owners with mortgages, less tenants (and price-reduced tenants)

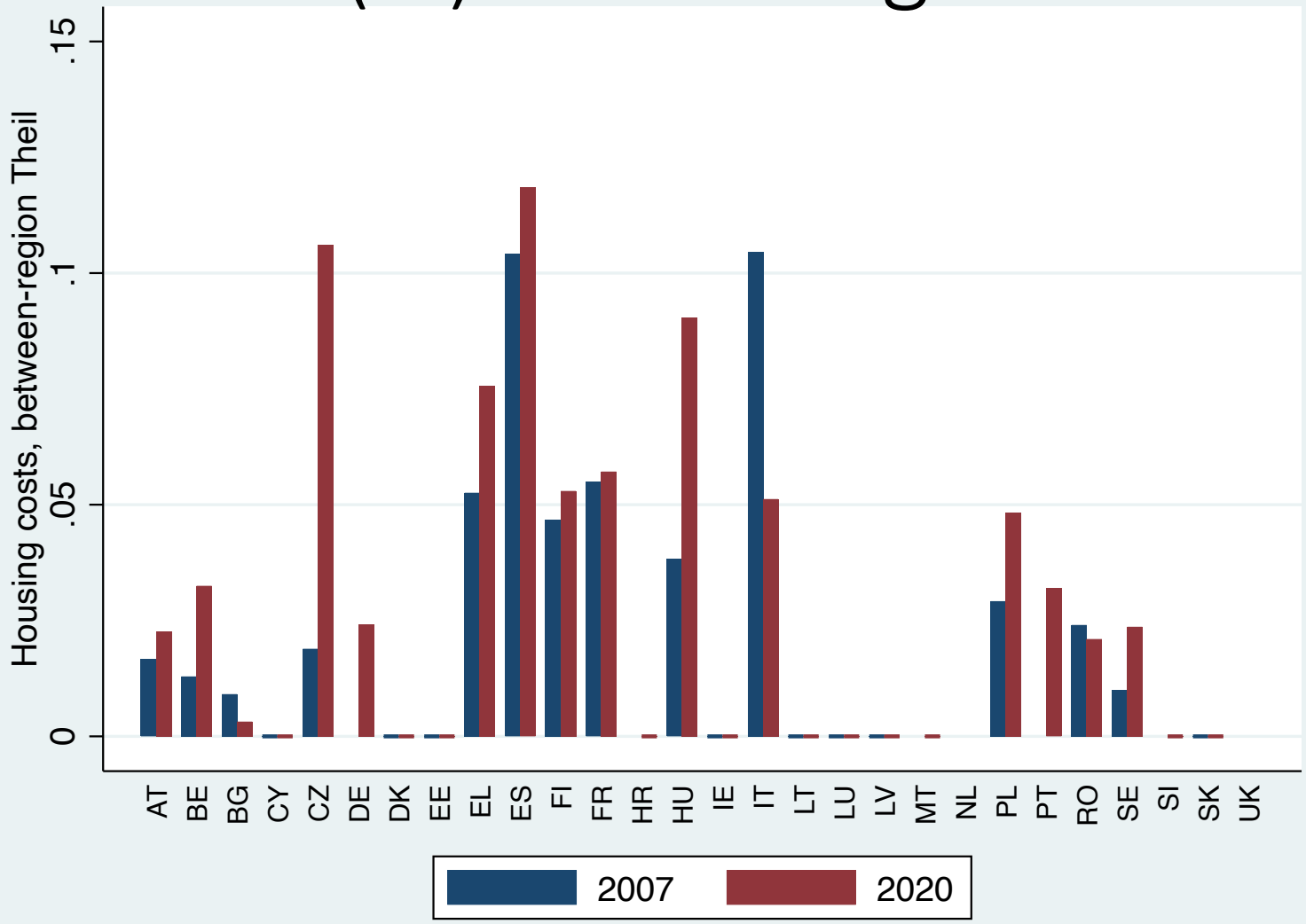
- The non-poor deprived (C) vs deprived (B+C)

Tenancy status, pp difference between non-poor deprived (A) and deprived, EU 2020

owner	mortgage	tenant	tenant reduced	free
2.0%	3.2%	-1.3%	-2.5%	-1.4%

More owners with mortgage SMD non poor than just SMD

Between-region component explaining variation (%) in housing costs



Theil indices of housing costs are expressed as three-year average [from t-1 to t+1]. Housing costs equivalised with the OECD-modified scale. Sensitivity analyses with no equivalisation lead to very similar figures and trends

Housing costs at regional level

- Express housing costs in a comparative way across regions (PPP)

- Regress housing costs over NUTS2, controlling for region-varying factors that influence them (# rooms, housing tenure, housing type, hh type for housing in good quality)

$$\log(Housing\ costs)_{ir} = \beta_0 + \beta_k \boldsymbol{X}_{ir} + \gamma_k RegionFixedEffects + u_{ir}$$

where *ir* stands for the individual *i* in region *r.* The γ coefficients of the *K* regional dummies capture the variation in housing costs across EU regions. Once housing costs are estimated $\log(\widehat{Housing\ costs})_{ir}$, average fitted values are respectively produced at the regional and national level.

- Compute local deviation from national average

$$Regional\ adjustment\ index = (\widehat{Housing\ costs}_r - \widehat{Housing\ costs}_{\bar{c}})/\widehat{Housing\ costs}_{\bar{c}}$$

- Big limitation: no within-region heterogeneity (see later. Further analyses in store)

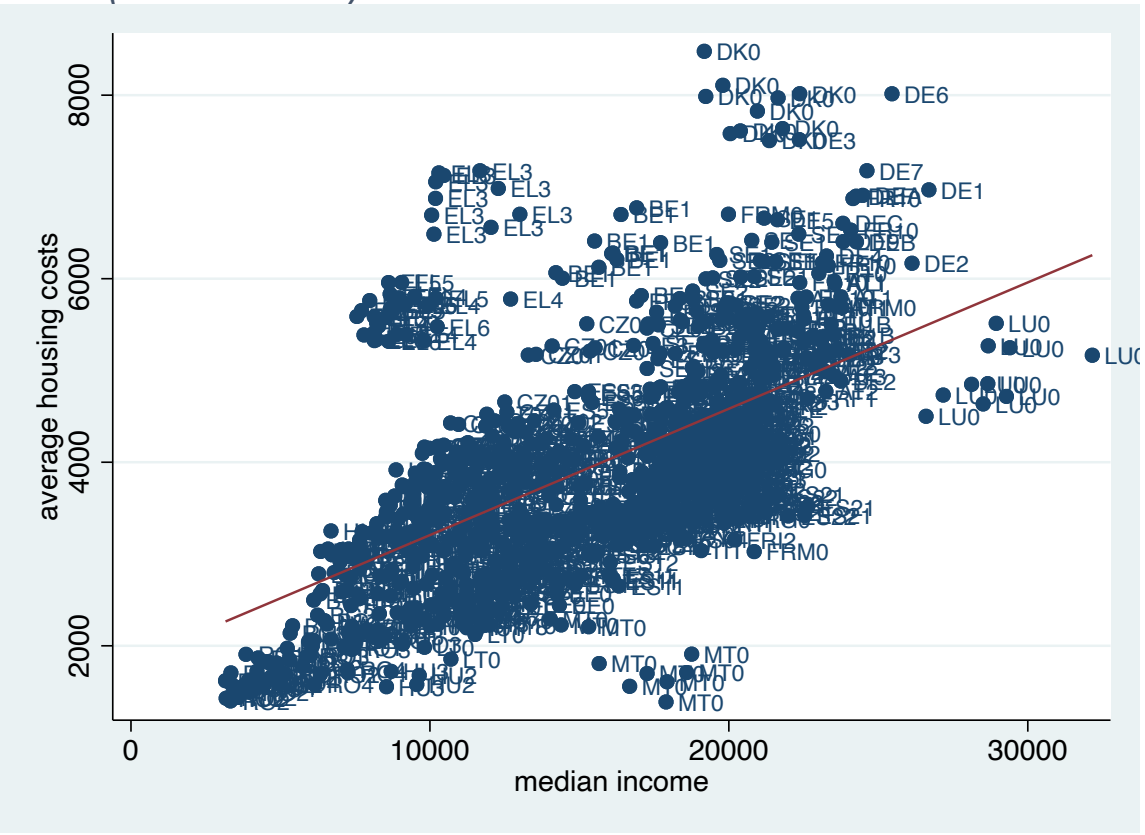
Data

EU-SILC

- Long span (2004 - 2021) for EU countries
- Comparable across countries
- Info on housing costs (rents, mortgage repayments, utilities and other costs, imputed rents)
- Material deprivation and subjective income needs
- Regional identifiers (with country-varying granularity)
- Urbanisation
- Auxiliary info on housing conditions (housing quality, type, # rooms)…

Correlation between housing costs and income?

Average housing costs vs median income levels at regional level (2011 to 2020)



- Correlation significantly above 60% for all years considered
- Some clear outliers (EL, DK versus MT)

Housing costs and income levels expressed in PPP. Average housing costs have been estimated to take into account region-varying factors such as above. Income equivalised with the OECD-modified scale.

Marginal effect of being in income poverty on the probability to be deprived for different levels of housing costs.

	Margin	s.e.	z	P>z	[95% conf.	interval]
income poverty at:						
(log)HC = 25th pct	**0.1336**	0.000014	9279.09	0	0.1336	0.1336
(log)HC = 50th pct	**0.1131**	0.000013	8435.9	0	0.1131	0.1132
(log)HC = 75th pct	**0.0957**	0.000016	6108.86	0	0.0957	0.0957
Note: dy/dx for factor levels is the discrete change from the base level.						

Model 1: key covariate is (log)housing costs. Years = 2013 to 2020. Marginal effect of income poverty over probability of material deprivation for different levels of housing costs

Within-country variation (regional)

	Coefficient of variation, 2020			Coefficient of variation, 2019		
COUNTRY	housing costs	povline 60	subj m.needs	housing costs	povline 60	subj m. needs
AT	0.0833	0.0064	0.0000	0.0820	0.0113	0.0046
BE	0.1392	0.1468	0.0619	0.1419	0.1610	0.0658
BG	0.0266	0.1274	0.1230	0.0465	0.1059	0.0857
CZ	0.1205	0.1067	0.1124	0.1284	0.1026	0.1174
DE	0.1396	0.0818	0.1043			
EL	0.1050	0.1465	0.0718	0.1077	0.1297	0.0766
ES	0.1570	0.1733	0.0929	0.1643	0.1809	0.1177
FI	0.1419	0.1015	0.1176	0.1385	0.1079	0.0990
FR	0.1531	0.0697	0.0679	0.1421	0.0736	0.0594
HU	0.2067	0.1381	0.0488	0.1603	0.0709	0.0597
IT	0.1177	0.2160	0.0414	0.1207	0.2053	0.1030
PL	0.0787	0.0720 .		0.0888	0.0709	0.0754
PT	0.0796	0.1389	0.1451	0.0735	0.1204	0.1432
RO	0.1001	0.1564	0.0293	0.1102	0.1632	0.0498
SE	0.0938	0.0471	0.0606	0.0881	0.0390	0.0684

- Higher variation in housing costs in DE, FR, HU, SE, AT
- Higher variation in income (povline) in IT, EL, BG, RO
- Similar results with max-min ratios

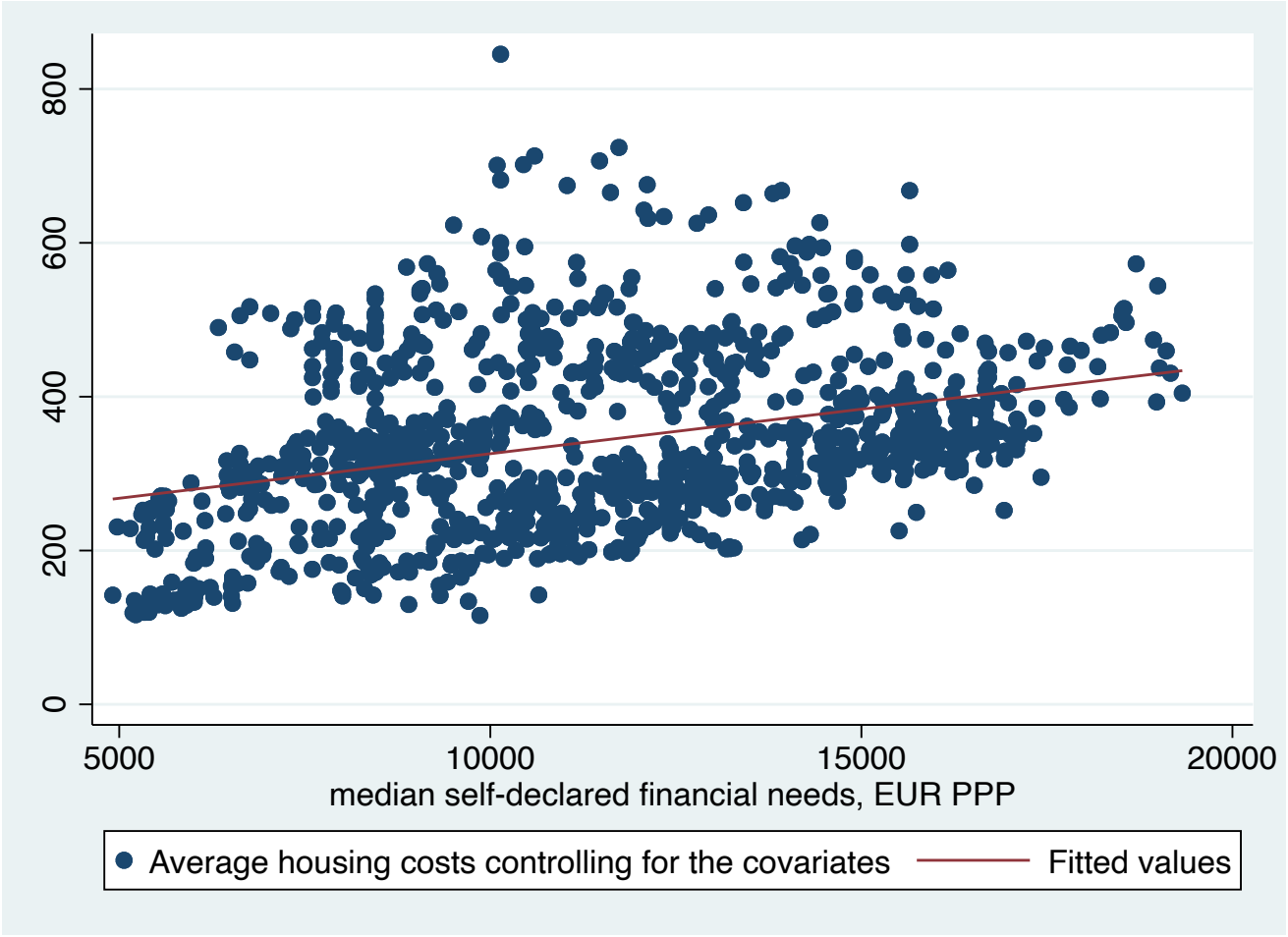
Within-country variation (reg*urbanisation)

COUNTRY	Coefficient of variation, 2020			Coefficient of variation, 2019		
	housing costs	povline 60	subj m.needs	housing costs	povline 60	subj m. needs
AT	0.1858	0.0418	0.0484	0.1580	0.0367	0.0353
BE	0.1119	0.1282	0.0772	0.1016	0.1289	0.0815
BG	0.0767	0.2115	0.1581	0.0923	0.2092	0.1420
CY	0.1540	0.1050	0.0486	0.2047	0.1117	0.0912
CZ	0.1128	0.0806	0.1067	0.1160	0.0806	0.1071
DK	0.1048	0.0187	0.0358	0.1107	0.0169	0.0413
EE	0.1893	0.1064	0.1055	0.2034	0.1254	0.1286
EL	0.1342	0.1281	0.0777	0.1363	0.1234	0.0795
ES	0.1787	0.1781	0.0868	0.1872	0.1852	0.1166
FI	0.1374	0.0874	0.0905	0.1409	0.0980	0.0839
FR	0.1827	0.1219	0.0923	0.1952	0.1516	0.1106
HR	0.0422	0.0921	0.1301	0.0171	0.1120	0.1118
HU	0.1869	0.1196	0.1214	0.1363	0.1108	0.1123
IE	0.1614	.	0.1111	0.1618	0.0623	0.0574
IT	0.1406	0.2107	0.0805	0.1541	0.2016	0.0855
LT				0.0616	0.1617	0.1478
LU	0.0356	0.1305	0.0693	0.0588	0.0850	0.0533
LV	0.1156	0.1030	0.0488	0.0398	0.0989	0.0532
MT	0.0067	0.0025	0.0240	0.1431	0.0076	0.0186
PL	0.1017	0.1300	.	0.1128	0.1323	0.1521
PT	0.1144	0.1437	0.1894	0.1507	0.1914	0.2108
RO	0.1665	0.2617	0.1772	0.1906	0.2861	0.2087
SE	0.1032	0.0648	0.0684	0.1001	0.0581	0.0601
SK	0.0706	0.0793	0.0908	0.0276	0.0921	0.0739

- Very similar results: within-country variation becomes greater in countries with rural/urban disparities (BG, RO).
- Only in Greece, housing costs show more variation than incomes with urbanisation info
- Same results with max-min ratios

Housing costs and self-reported needs

Average housing costs vs subjective money needs, EU regions 2011-2020



- Housing costs less correlated with self-reported monetary needs than reg povlines
- Same results with urbanisation info