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Material deprivation and its relationship with the welfare state classification

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Research question and Methodology

Research Question:

How do countries cluster on material deprivation items keeping in mind the welfare state typology?

How do indicators usually underlying Welfare State particularities influence on the prevalence (size) of deprivation?

Methodology: panel data at country level built on deprivation indicators from EU-SILC 2013-2016

(access was granted through InGrid Network at LISER Luxemborg)

EU-27 countries not included: DE, NL, IR, FI, LT, UK

- macro level indicators from Eurostat datasets
- cluster, regression
- SPSS, Stata

Material Deprivation (MD): It is seen as the result of a persistence of incomes shortage; material hardship expressed in relation to consumption largely accessible in society or to basic need.

(Fusco 2011; Guio, Marlier, 2017)

Research question and Methodology

The EU statistics operationalizes **severe material deprivation**, as the proportion of people living in households which cumulate at least 4 of the following situations:

1. They cannot face unexpected expenses
2. They cannot afford one week o holiday away from home
3. They cannot avoid arrears (in mortgage or rent, utility bills or hire purchase installments)
4. They cannot afford a meal with meat, chicken, fish, or vegetarian equivalent every second day
5. They cannot keep their homes adequately warm
6. They cannot afford a washing machine (enforced lack)
7. They cannot afford a colored TV (enforced lack)
8. They cannot afford a telephone (enforced lack)
9. They do not have access to a car/van for personal use (enforced lack)

Literature review

- In this research we take a cluster analysis macro approach and for this we will emphasize the macro variables that turned out significant in previous studies.
- Most studies use micro and macro data in a multilevel approach to investigate the household events and the effect of decommunitarization and defamilialization on material deprivation (Israel and Spannagel 2018, Guio, Marlier, Vandenbroucke, Verbunt, 2020, Viser, Gesthuizen and Scheepers 2014, Bárcena-Martín et al. 2014)
- Few studies take a macro approach Dudek (2019), Ribeiro et al. (2015), , Kis, Ozdemir and Ward (2015), Calvert and Nolan (2012), most studies use a country panel data approach except for Dudek who used generalized estimating equations (GEE) for fractional outcomes.
- Dudek (2019) investigates severe material deprivation in EU countries using a generalized estimating equations approach for fractional outcomes and has two models one in which the factors are GDP per capita, long term unemployment and social protection, and one in which the factors are income, poverty gap. She finds a negative association between GDP per capita and severe material deprivation rate, long term unemployment rate is positively associated with severe deprivation rate and social protection is negatively associated with severe deprivation rate. In the model in which she uses median equivalised disposable household income and the relative median at-risk-of-poverty gap as regressors she finds a negative association between income and severe deprivation rate, and a positive association between the poverty gap and severe deprivation rate.

Literature review

- Kis, Ozdemir and Ward (2015) perform their analysis on a panel of EU 27 countries between 2005-2012 on the severe deprivation rate and use the following dimensions: economic development (median disposable income), inequality (poverty gap), institutions (public services and social benefits), population structure, cultural differences.
- These dimensions are operationalized in the following factors: log disposable income, relative-at-risk-of-poverty gap, log social transfers, education expenditure, health expenditure, pensions expenditure, unemployment benefit, family and children benefit, share of primary educated, employment rate, share of large households, share of young people, share of urban population, savings rate, log tourism per capita, log vehicles per capita.
- A fixed effects model to analyse the panel data, including country as well as time fixed effects, is also defined, which controls for all (observed and unobserved) year-specific country-invariant and country-specific time-invariant factors.
- The first regression has as dependent variable the severe deprivation rate. They find that disposable income is negatively associated with severe deprivation rates, while poverty gap is positively associated, and the interaction between disposable income and poverty gap is negatively associated, the share of young people is positively and significantly associated with the severe deprivation rate.

Literature review

- Kis, Ozdemir and Ward (2015) Next the authors picked three items of the 9 of material deprivation, able to cover unexpected expenses, able to afford a car, able to go on vacation to test the cultural variables identified: savings rate, stock of vehicles, participation in tourism.
- The first regression has as dependent variable able to cover unexpected expenses and again disposable income is negatively associated with the dependent variable, the savings rate is negatively associated with the dependent variable, while the savings rate interacted with disposable income is positively associated with being able to cover unexpected expenses.
- The second regression has as dependent variable able to afford a car and as independent variables disposable income, poverty gap, stock of vehicles, and the interaction between stock of vehicles and disposable income. The authors find again a negative strong association between disposable income and a positive association between the poverty gap and being able to afford a car, the stock of vehicles is negatively associated with being able to afford a car, while the interaction between disposable income and the stock of vehicles is positive associated with being able to afford a car.
- The third regression is on being able to go on vacation, again the disposable income is negatively associated with the dependent variable, while the poverty gap is positively associated with being able to go on vacation, participation in tourism is negatively associated with being able to afford a vacation, while the interaction between tourism and disposable income is positively associated with being able to go on vacation.
- The final model for the severe deprivation rate includes disposable income, the poverty gap, the interaction between disposable income and poverty gap, employment rate, urban households, savings rate, the interaction between savings rate and disposable income. The model shows again that disposable income is negatively associated with severe deprivation rate, poverty gap is positively associated with severe deprivation rate, the interaction between disposable income and poverty gap is negatively associated with the severe deprivation rate, employment rate is non-significant, urban households is positively associated with severe deprivation rate at a 10% level, the savings rate is negatively associated with severe deprivation rate, and the interaction between the savings rate and disposable income is positively associated with severe deprivation rate. Based on this, the overall conclusion is that disposable income and inequality measured by the poverty gap are significant drivers of material deprivation rates, their coefficients remaining of a similar size as in earlier specifications. A higher average disposable income is associated with a lower SMD rate, a wider poverty gap with a higher SMD rate. In higher income countries, the SMD increasing effect of a wider poverty gap seems to be smaller. While a higher savings rate is associated with a significantly lower SMD rate, this effect is reduced by the interaction between savings and income, where in a high income country, a higher savings rate reduces lower SMD rates less than in a lower income country. All the models, including those ones in the previous section, however, were tested for multicollinearity and all pass the tolerance test (i.e. the variance inflation factor, VIF, is sufficiently low).

Literature review

- Calvert and Nolan (2012) use a fixed effect panel data regression for 27 observations over 2004 – 2010.
- The factors considered are: median disposable income, Gini coefficient, at risk of poverty rate, the level of household joblessness, lagged material deprivation country fixed effects.
- Multivariate analysis of the pooled cross-sectional and time-series data via fixed effects regression models showed that median income has a substantial role to play in explaining variation in the rate of material deprivation, as might be expected. However, the Gini summary measure of income inequality was also seen to be statistically significant and positively associated with material deprivation, in a model that includes it with median income as explanatory variables, and in an expanded model that also includes the ‘at risk of poverty’ and household joblessness rates. Thus, controlling for median income, an increase in the level of income inequality is associated with an increase in material deprivation. After taking account of median income, income inequality, the “at risk of poverty” rate and joblessness, countries with higher rates of material deprivation than the model would predict include Cyprus and Bulgaria, and to a lesser extent, Luxembourg; on the other hand, Estonia, the Czech Republic and Portugal have lower levels of material deprivation than would be expected on the basis of their values on those explanatory variables. When an interaction between median income and income inequality is added to the model it is significant and negative, suggesting that the impact of inequality on deprivation decreases as median income increases. With some evidence that inequality may have an impact on deprivation even over such a short period with a limited number of observations to analyse, this suggests that further investigation of this relationship and the channels of influence through which it might work, on a country-by-country basis, is warranted.

Literature review

- Ribeiro et al. (2015) review the macroeconomic mechanisms of poverty, they propose a composite index to capture multidimensional poverty as to allow a comparative assessment of deprivation across European Union countries, the authors use deprivation and poverty interchangeably. The authors propose the Index of Multiple Deprivation for Developed Countries which is calculated for the United Kingdom (UK) (England, Scotland, Wales and Northern Ireland) presented, for example, in McLennan et al (2011), to assess deprivation in 24 countries of the EU, from 2005 to 2012.
- The index (IMD_D) is composed of the following dimensions:
 1. Income (risk of poverty threshold, inability to face unexpected financial expenses),
 2. Employment (long term unemployment, population living in jobless households)
 3. Health and disability (self perceived health as bad or very bad)
 4. Education, skills and training (persons with upper secondary or tertiary education attainment, early leavers from education and training)
 5. Barriers to housing and service (housing overburden rate, overcrowding rate, severe house deprivation rate)
 6. Crime (crime, violence and vandalism in the area)
 7. Living environment (inability to keep the household adequately warm, inability to afford a meal with chicken and meat (or a vegetarian equivalent) every second day; pollution, grime other environmental problems)

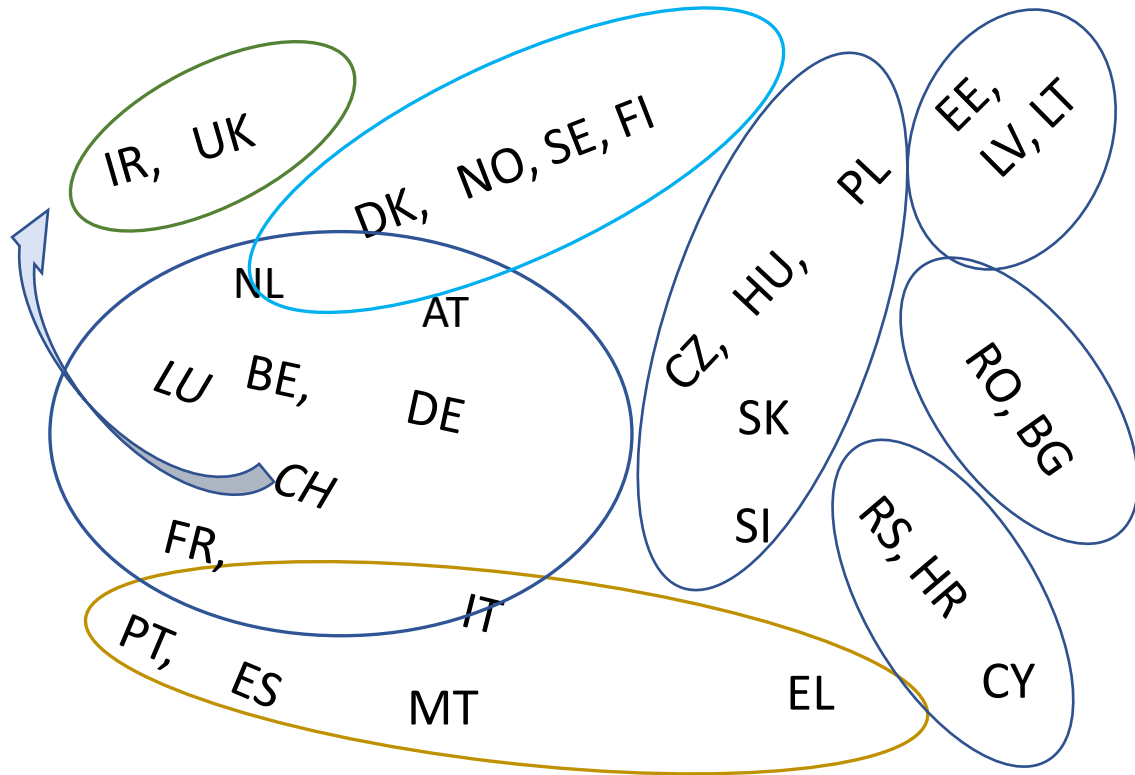
They are weighted using UK weights but a data driven approach is also tested. The Index of Multiple Deprivation is then regressed using a macro panel data approach against the following dimensions :

- (i) economic growth and poverty (public investment, public investment lag, per capita GDP, per capita GDP lag, per capita GDP interacted with Gini, per capita GDP lag interacted with Gini)
 - (ii) links between macroeconomic stabilisation and poverty (unemployment rate, unemployment rate lag, net social benefits, a lag of a binary variable identifying recession years, net social benefits interacted with recession periods, inflation, inflation lag)
 - (iii) institutional environment (an average of the six World Governance Indicators: Government Effectiveness, Political Stability and absence of violence/terrorism, regulatory quality, rule of law, voice and accountability, control of corruption (Kaufmann et al, 2010).
- Relying on the macroeconomic transmission mechanisms that influence poverty, a panel data econometric approach is implemented to study the relation between the proposed composite index and macroeconomic variables. Results show that a multidimensional poverty concept is relevant for assessing deprivation in Europe and that the dynamics of main macroeconomic variables crucially affect deprivation performances. The latter result is robust, holding for different poverty measures (AROPE, the Index of Multiple Deprivation for Developed Countries).

Literature review

- Ribeiro et al. (2015) has two models one for IMD_D and one for AROPE:
- Specification (I) assesses the role of growth in affecting multiple deprivation. The authors conclude that growth is not as important in explaining deprivation when larger-scope deprivation measures (such as IMD_D) are considered but that it tends to be strongly positively related to poverty reduction when deprivation is more monetary-biased in definition (growth-related variables are statistically significant at 1 per cent for AROPE, while they are only significant at 5 per cent, at the most, in the other regressions). But Specification (I) omits relevant explanatory variables.
- Specification (II) highlights the effect of macroeconomic stabilisation on deprivation. Larger current unemployment (IMD_D) or lagged unemployment (AROE) significantly contributes to increasing deprivation, in line with the literature. In addition, though net social benefits are, on average, neutral to AROPE deprivation, their effect is statistically positive and significant in reducing IMD_D; moreover, their effects are even larger with respect to reducing deprivation during recession periods (the marginal effect of net social benefits is larger during recessions, as the coefficient on the cross-product NET_SOC_BENEF*OUTPUT_GAPR is significant and negative, even in the AROPE regression). In turn, inflation appears to have no effects on deprivation when using AROPE or IMD_D to assess deprivation. This evidence reflects the rather steady and low inflation rates that have characterised European countries in recent years.
- Specification (III) combines the stabilisation and growth determinants with the composite index for the quality of institutions. A higher-quality institutional environment contributes to reducing deprivation. The results are robust for all measures but slightly less significant for AROPE. More stable, credible and rights-protective environments deliver lower deprivation, amplifying the impacts of growth and macroeconomic stabilisation on reducing poverty. Per capita GDP growth reduces deprivation, but it appears to be more crucial to AROPE and IMD_D than to IMD_D (data-driven); lagged investment is rather robust in reducing deprivation across regressions. In any specification, and robustly across regressions, a reduction in unemployment statistically significantly reduces multidimensional deprivation, while increases in net social benefits during recessions reduce deprivation only if measured by IMD_D or AROPE.

Welfare state classification



(Esping-Andersen, 1999; Ferrara, 2000; Deacon 2000; Arts, 2002; Boeri, 2005; EC, 2006; Eamets, Philips & al, 2007; Fenger, 2007)

No unique classification of WS, it depends on

- indicators considered for classification, such as
 - GDP
 - Shares of various social expenditures
 - Taxes as % in state budget
 - Indicators for LM openness toward various groups (youth, women, low education) and flexibility
 - Incomes/ earnings inequality
 - Effectiveness or extend of various income schemes
 - Share of children in institutional care/ dependent children

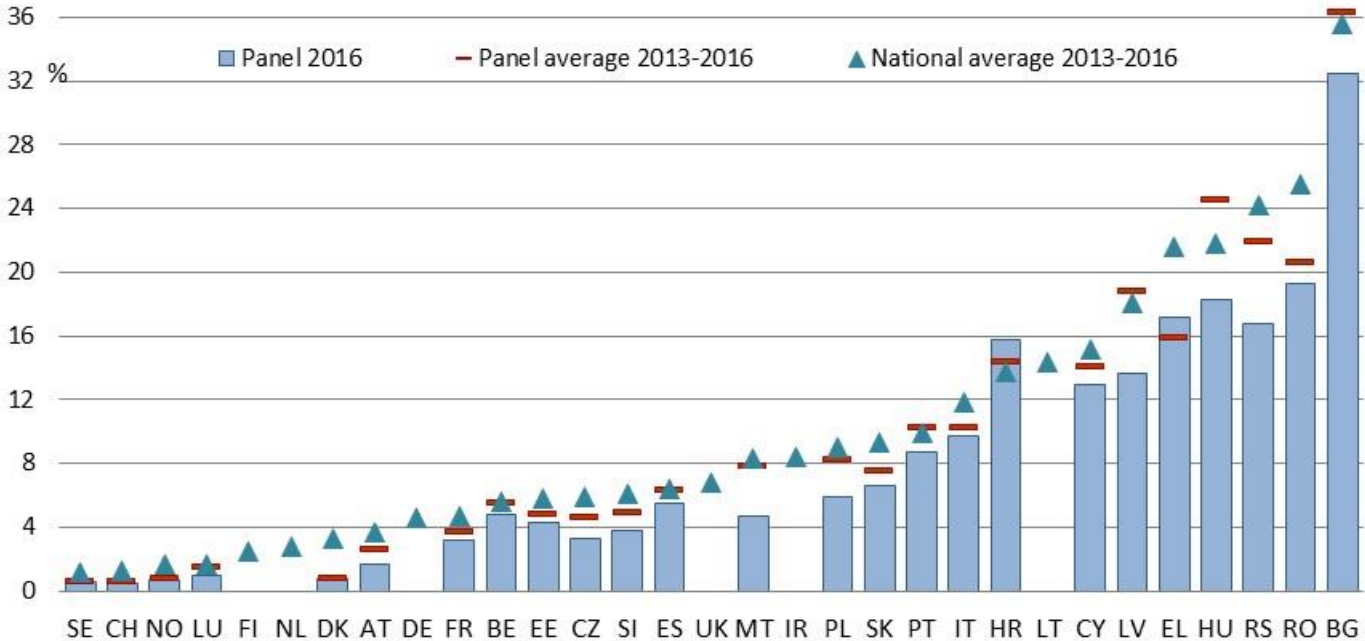
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- method, countries considered
- time (context, changes in development strategies)

No tendency of the EECs

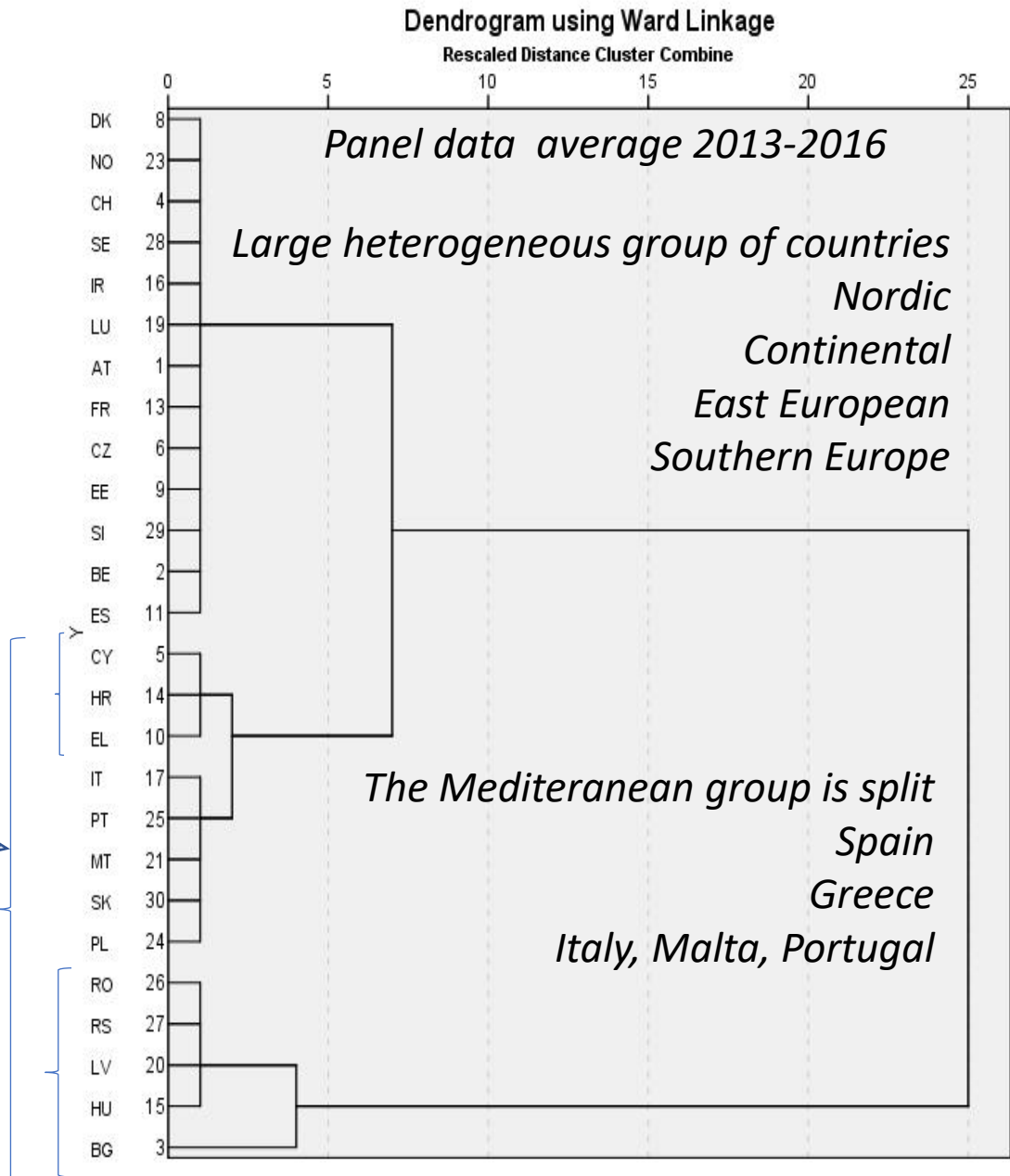
Severe Material Deprivation (SMD)

SMD, panel vs national sample data



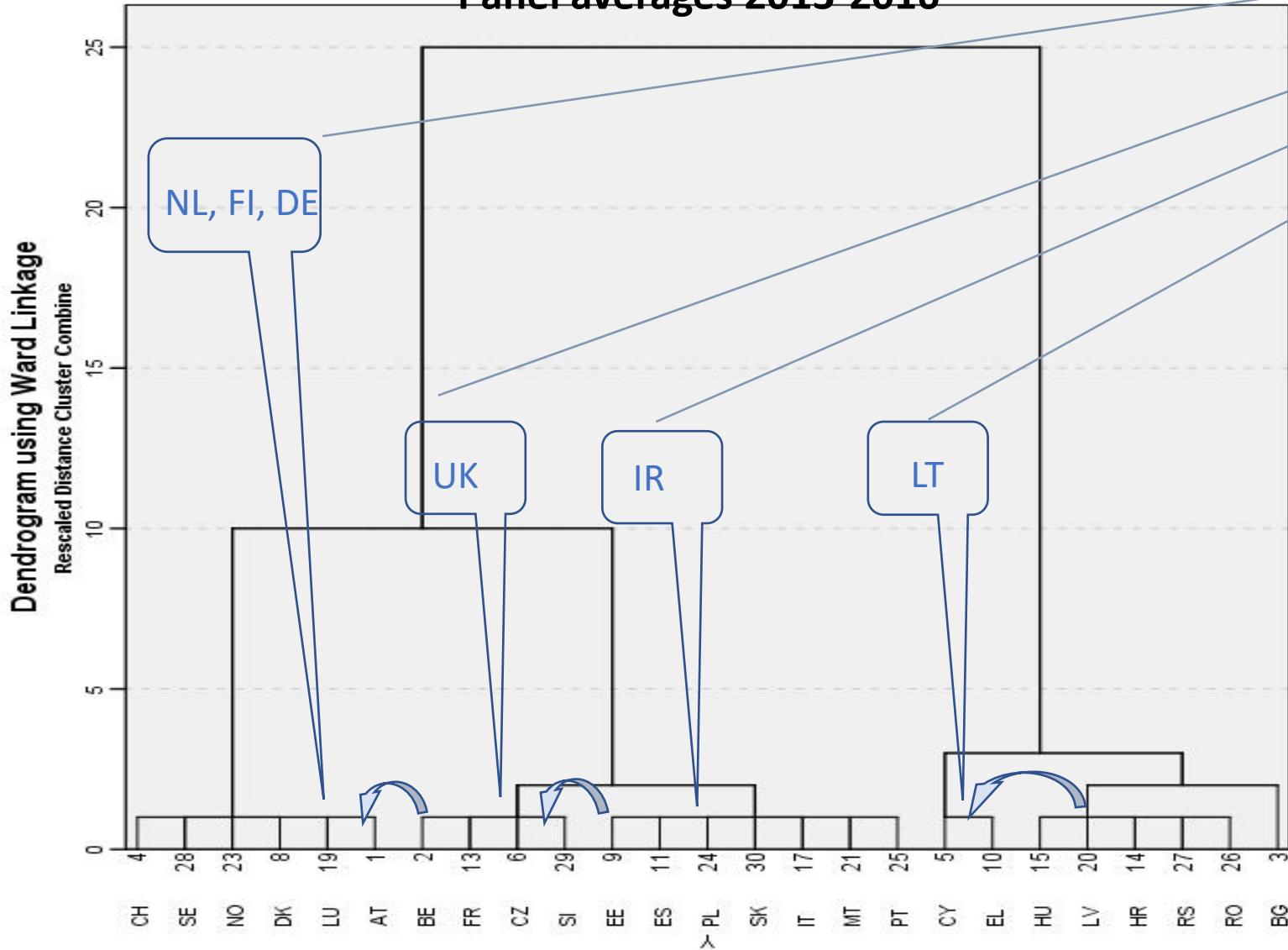
2013-2016, improvements with respect to SMD
 the average panel values > the 2016 panel values
 Exceptions: HR and EL

The national averages are most often \geq the panel averages
 Exceptions: PT, HR, LV, HU, BG



Clustering by the 9 material deprivation items

Panel averages 2013-2016



by national averages; missing countries

CZ, SI and EE delineate by EECs

HU goes close to Balcanic states

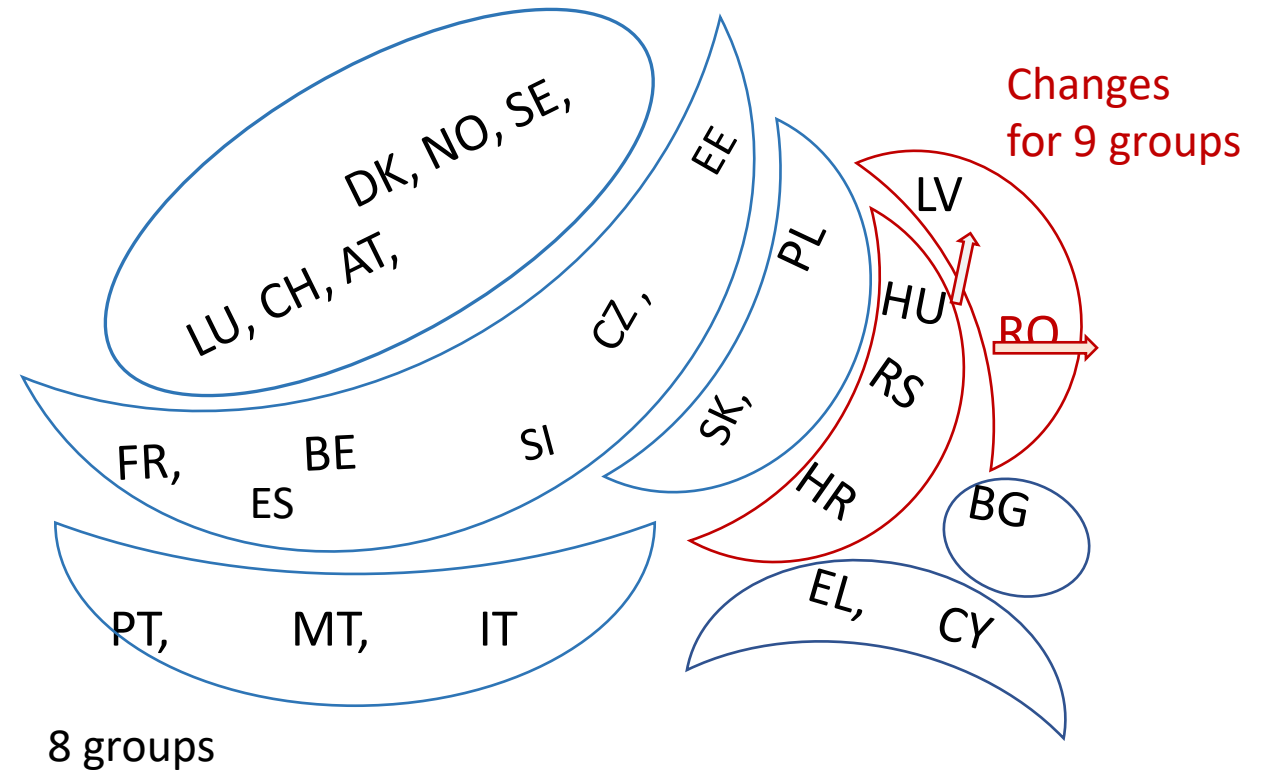
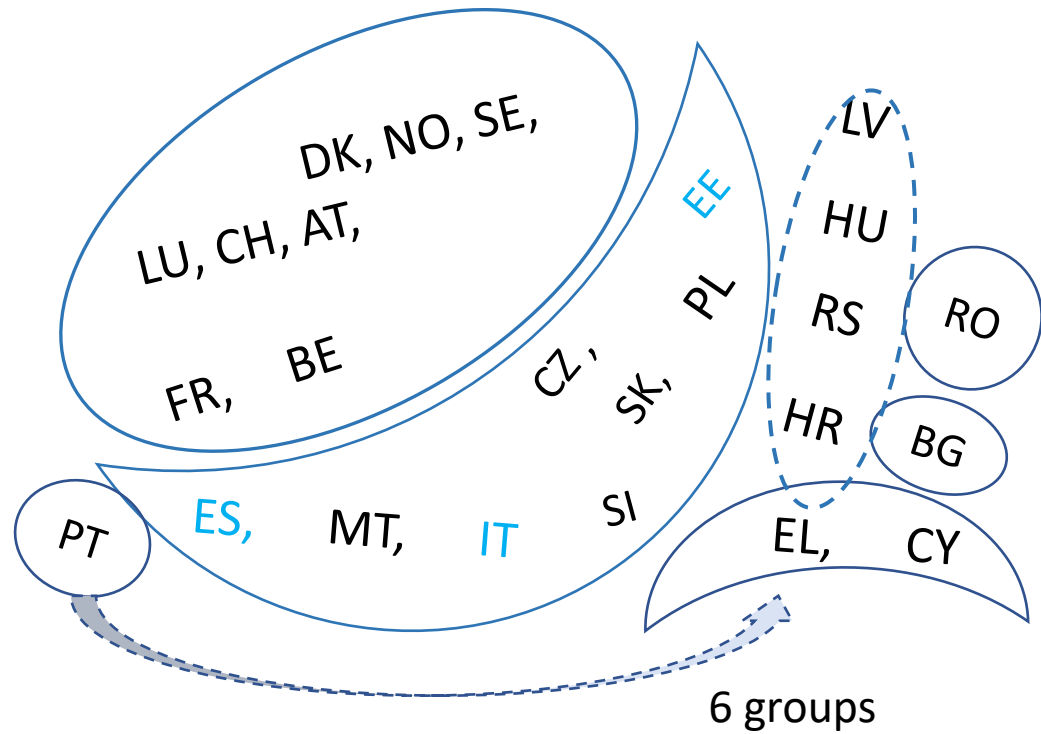
Spain and Greece "leave" the Southern group

CY and EL tends to delineate by any other group

Neither the Baltic, nor the Vişegrad countries form groups

The Nordic and the highest income continental countries form a group

Classification by material deprivation items – panel averages



Distance of Cases from their Classification Cluster Center		
	Maximum	Variance
4 groups	29.62	63.99
5 groups	22.68	39.97
6 groups	18.41	29.00
7 groups	16.64	24.08
8 groups	14.97	18.75
9 groups	13.88	16.24

France is not a "Southern" country
 The Southern group has no stability as a group
 The Visegrad and the Baltics are rather regional/geographical grouping criterias
 The EECs countries is not a group

Clustering by SMD predictors – 2013-2016 averages, Eurostat data

Based on literature review

a. Categories of macro-level predictors: Economy/ level of development

Inequality, employment and education

Social protection, size and specific

Society, cohesion, trust → *Ended up with 49 indicators*

b. Averages for 2013-2016 (years of our micro-data)

hypothesis: potential lagged impact on SMD for some predictors

Due to 2008 crisis lag limited to average 2011-2014 average

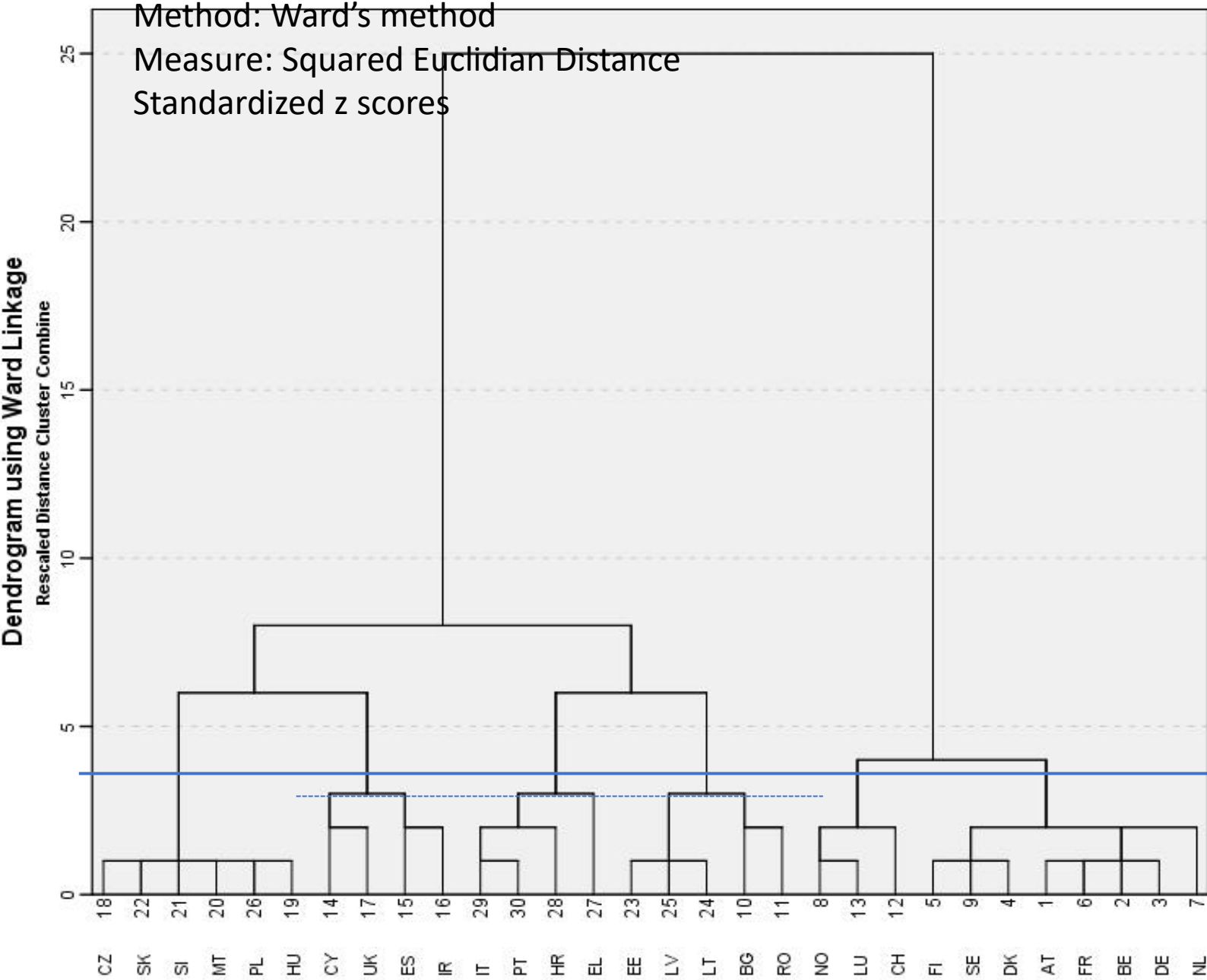
c. Correlation coefficients with SMD, keeping as predictors just those of the strongest correlation.

- trust in political system, 2013
- low satisfaction with time used, 2013
- have someone to ask for help, 2013
- participation in LLL during last 12 months, 2011
- crime/ violence in the area, 2011-2014 average
- long term unemployment, 2011-2014 average → *Ended up with 27 indicators*

Clustering by SMD predictors – 2013-2016 averages, Eurostat data

	Economy	Inequality: education&employment	Social protection	Society
KEPT	<p>median disposable incomes/ capita</p> <p>taxes % of GDP</p>	<p>Relative median income gap</p> <p>Gini (before and after social transfers) LLL12months, 25-64 y.o.</p> <p>Tertiary education, 25-64 y.o.</p> <p>NEETs, 15-24 y.o.</p> <p>Long term unemployment 20-64 y.o</p> <p>Part time employment 15-74 y.o.</p> <p>Self employment 15-74 y.o.</p> <p>Population in HHDs with low work intensity</p> <p>Unmet medical care services</p> <p>Low satisfaction with time use</p>	<p>Social protection / capita</p> <p>Reduction of poverty thru social transfers</p> <p>Non means tested social protection, % GDP</p> <p>Health care expenditures, %GDP</p> <p>Education expenditure, %GDP</p> <p>Sickness and disability (soc prot), %GDP</p> <p>Unemployment (soc prot), %GDP</p> <p>Social exclusion (soc prot), %GDP</p> <p>Old age, % social protection</p> <p>Housing, % social protection</p>	<p>Trust</p> <p>political system</p> <p>Have someone to ask for help</p> <p>Crime / violence in the area</p>
DROPE OUT	<p>GDP/ capita</p> <p>Fix capital formation, %GDP</p>	<p>Poverty before and after social transfers</p> <p>Low educated people, 25-64 y.o.</p> <p>Unemployment rate 15-74 y.o.</p> <p>Gender employment gap, 20-64 y.o.</p> <p>Temporary employment 15-74 y.o.</p>	<p>Social protection %GDP</p> <p>Means tested social protection</p> <p>Social protection in kind and monetary</p> <p>Survivor and Family/ child care (% GDP or % social protection)</p>	<p>5 WB indicators</p>

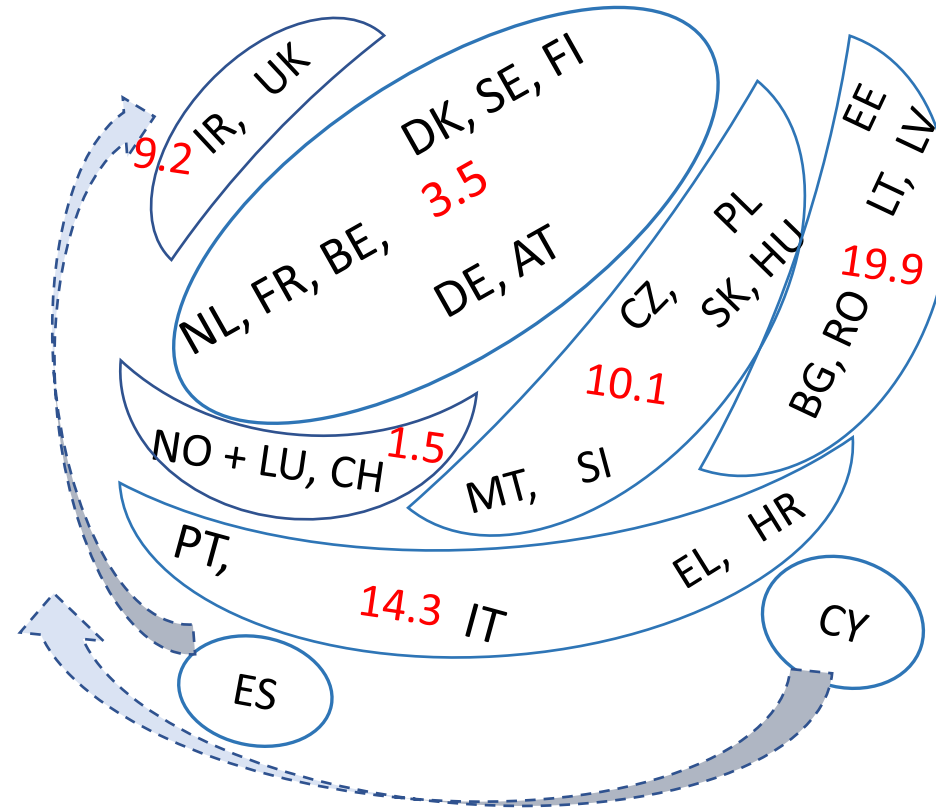
Classification by SMD predictors



- 6 clusters solution**
- Cluster 1: DK, FI, SE + AT, FR, BE, DE + NL
 - Cluster 2: NO, LU + CH
 - Cluster 3: EE, LT, LV + BG, RO
 - Cluster 4: IT, PT + HR+ EL
 - Cluster 5: CY, UK + ES, IR
 - Cluster 6: CZ, SK, SI, MT, PL, HU

Classification by SMD predictors –Eurostat data

The Continental and Nordic countries tend to group together
NO, NL uncertain assignment



The Visegrad Cs.
Homogenous

the Baltics stay together
close to BG, RO

The Southern group of WS splits/ volatile
+ Southern Balkans
+ EECs (Visegrad)
+ the European Liberal

Preliminary Conclusions

- Cluster methods neither the panel averages of severe material deprivation items nor the macro cluster predictors identify the Southern type as a distinct stable group
- The distinction between the Nordic group and the European Continental tends to fade away.
- Bulgaria and Romania tend to be outliers, Romania tends to go towards the Baltic countries, Visegrad countries and the Baltics based on macro predictors tend to keep the groupings based on welfare state typology but based on specific material deprivation items do not.
- Further research will be carried on at the level of micro-data panel households from EU-SILC to link severe material deprivation to macro predictors
- A second direction of analysis perhaps a factorial analysis to reduce the number of predictors
- A third direction, a panel fixed effects country data will be constructed for the years 2011-2018 (during the last five years the level of severe material deprivation decreased significantly)

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Thank you for your attention

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