Third workshop of the EU H2020 MAKWSELL project (Monetary) Poverty lines and local price levels

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Aims of the presentation

- The importance of estimating poverty indicators at sub-national level is nowadays worldwide recognized
- Poverty is a multidimensional concept: we focus on relative monetary poverty indicators
- There are relevant issues when computing sub-national poverty indicators that may impact their value, namely:
 - 1. the choice between the use of income or consumption data (not discussed here)

- 2. the use of national or local poverty lines
- 3. taking into account and compute the price levels

The use of national or local poverty lines

- Regional HCRs based on two alternative PLs: national and regional
- For many regions the level of the HCR change a lot when the regional PL is used instead of the National PL
- Then, we extend the analysis at the provincial level to see if we observe the same behaviour
- For HCR at provincial level, the PL can be defined also at the provincial level
- Sample size at provincial level is often very small → SAE methods to get reliable estimates

The use of consumption data to estimate the poverty incidence

- In Italy the relative and absolute poverty incidence is computed by Istat by using data from the Household Budget Survey
- To compute the relative poverty incidence, the poverty line is set, for households of two components, equal to the mean per-capita expenditure computed at national level

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The poverty line for households with a different number of components is then obtained by multiplying it with a specific coefficient (0.60 for households with one member, 1.33 for households with three members, etc.)

The use of consumption data to estimate the poverty incidence

- The PL used in the computation of the HCR with expenditures data depends on the level of the mean per-capita consumption expenditures that in Italy varies strongly among regions
- The percentage difference reaches the 50% comparing northern with southern Italian regions

- Therefore, it is important to evaluate the impact of the use of sub-national poverty lines in measuring the poverty incidence
- At regional level (NUTS2 level) direct survey estimates are statistically sound

Household poverty incidence at regional level with national and regional PLs



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Household poverty incidence at regional level with national and regional PLs





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Household poverty incidence at regional level with national and regional PLs

- The use of different PLs has strong geographical implications in the evaluation of Italian households' poverty
- The choice of the poverty definition and of the PL depends on the level of analysis and the kind of the policy to be implemented (Kangas and Ritakallio, 2007)
- For comparing relative monetary poverty at regional (local) level, it seems justified the use of region-specific PLs (Mogstad et al., 2007)

Household poverty incidence at provincial level with national, regional and provincial PLs

- Having observed a high impact of the regional PL definition on the regional HCRs, we extend the analysis at the provincial level
- When computing the HCR at provincial level, the PL can be defined not only at national or regional level, but also at provincial level
- The 2012 HBS sample size at provincial level, varying from zero to 1037, with a median value of 146, is for most of the provinces too small to obtain reliable estimates both of the HCRs and of the PLs at provincial level

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 Therefore, we use a small area model to obtain more accurate estimates Household poverty incidence at provincial level with National PL (NPL) and Regional PLs (RPLs)



Household poverty incidence at provincial level with National PL (NPL) and Regional PLs (RPLs)



Macro area + North-West + North-East - Center + South and Islands

Household poverty incidence at provincial level with Regional PLs (RPLs) and Provincial PLs (PPLs)

- The effect on provincial HCRs switching from national to regional PLs or from national to provincial PLs is similar
- The effect on provincial HCRs switching from regional to provincial PLs is smooth
- The results suggest that measuring the monetary poverty incidence at provincial level using national or local (regional or provincial) thresholds strongly change the picture of the phenomena

Household poverty incidence at provincial level with Regional PLs (RPLs) and Provincial PLs (PPLs)



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Household poverty incidence at provincial level with Regional PLs (RPLs) and Provincial PLs (PPLs)



Macro area - North-West - North-East - Center - South and Islands

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Take into account price levels

- The real value of money change over space
- To account such a change Purchasing Power Parities (PPPs) can be used
- PPP is an exchange rate between two locations which is based on a basket of common goods
- We want to explore if there is different purchasing power within the country and if there is how big is its impact on the poverty line
- Final goal: obtain PPPs among regions or provinces of Italy that are poverty specific

Researches conducted in Italy to compute PPPs

- In 2004, Istat started the computation of official regional consumer spatial price indexes (called PPPs), by using CPI data and ad hoc surveys, which published for the year 2006 and 2009 (Biggeri L., Laureti T., Polidoro F., 2017; Biggeri L., Laureti T., 2018, 2019)
- The computations show significant differences in the level of consumer prices (especially for the house dwelling rents) across the regional capitals
- Limits: Labor-intensive preliminary analyses, high costs for carrying out ad hoc surveys for clothing and other products
- Istat, through a specific project included in the National Statistical Plan, has planned to regularly produce spatial price consumer indexes at regional level by using a multi-sources approach (Data Warehouse of microdata)

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Researches conducted in Italy to compute PPPs

- First phase: By using only CPI data to verify to what extent the type and characteristics of the data affect the estimates
 - Significant consumer price level differences across Italian region's chief town
- Second phase: Begin to explore scanner data obtained from the retail trade chains of the modern distribution to build sub-national PPPs
 - It is essential to estimate sub-national PPPs at lower levels of the ECOICOP product classifications (consumption segments) when the subclass of products is composed of heterogeneous products
 - There is a great heterogeneity across consumption segments within a subclass and across the Italian regional chief towns which affect the results
 - Different characteristics of modern retail distribution among Italian regions
- Third phase: Compute the general household consumption sub-national Spatial Price Indexes by using a combination of CPI and scanner data

MAKSWELL project – Dagum

- Combine CPI, HBS and scanner to compute poverty specific sub-national PPPs
- First experiment:
 - 1. Evaluate the share of food expenditure and housing cost on total consumption expenditure for poor and all households
 - 2. Compute local (region/province) PPPs for food and beverages and spatial house cost index
 - 3. Adjust national poverty line combining 1. and 2., then obtain HCRs estimates

Wherever in these steps estimated quantities are not reliable we can resort to SAE methods

PPPs for food and beverages

We used a basic CDP model to compute PPPs for food using aggregated scanner price data

$$\ln p_{ir} = \sum_{r=1}^{R} \alpha_r D_r + \sum_{k=1}^{K} \beta_k D_k^*$$

- *p_{ir}* average price of goods of type *i*, where *i* = 1 *ldots*, 102 (ECOICOP 8 digit) in region *r*
- D_r are dummies for the regions and D^{*}_k are dummies for the type of product where k = 1,..., 54 (ECOICOP 5 digit)
- $exp(\alpha_r)$ is the PPP of region *r* respect to the base region (following the work of Suits, 1984 we can obtain PPP respect to Italy)
- Our idea is to replace p_{ir} by a low quantile of price of goods of type i, therefore exp(a_r) is the PPP of region r for low prices
- The idea is that relative poor people mainly buy cheaper goods, therefore the left part of the distribution of price is more "representative" of poor people

PPPs for food and beverages (base: Italy) – first results

Region	PPP(average)	<i>p</i> -val	PPP(1st Dec.)	<i>p</i> -val	PPP(1st Quart.)	<i>p</i> -val	PPP(Median)	<i>p</i> -val	PPP(9th Dec.)	<i>p</i> -val
Piemonte	0.170	0.004	-0.018	0.716	0.009	0.854	0.047	0.360	0.152	0.011
Valle d'Aosta	-0.019	0.842	0.233	0.004	0.144	0.080	0.072	0.381	-0.107	0.264
Lombardia	0.137	0.105	-0.027	0.711	0.001	0.985	0.051	0.486	0.136	0.110
Trentino-Alto Adige	-0.018	0.833	-0.038	0.602	-0.030	0.685	-0.020	0.789	0.040	0.645
Veneto	0.004	0.965	0.018	0.800	0.010	0.888	0.017	0.813	0.047	0.581
Friuli-Venezia Giulia	-0.001	0.990	0.038	0.600	0.016	0.833	0.028	0.705	0.016	0.855
Liguria	0.088	0.303	0.037	0.613	0.034	0.645	0.043	0.561	0.130	0.132
Emilia-Romagna	0.060	0.475	-0.052	0.466	-0.020	0.786	0.021	0.775	0.083	0.329
Toscana	0.072	0.395	-0.061	0.396	-0.048	0.516	-0.001	0.989	0.096	0.262
Umbria	-0.008	0.923	0.010	0.897	0.039	0.601	0.040	0.599	0.008	0.925
Marche	-0.066	0.445	-0.050	0.490	-0.019	0.799	-0.046	0.541	-0.048	0.583
Lazio	0.046	0.587	-0.058	0.423	-0.037	0.622	0.027	0.719	0.090	0.297
Abruzzo	-0.050	0.557	-0.010	0.887	-0.014	0.848	-0.022	0.764	-0.042	0.625
Molise	-0.115	0.201	-0.026	0.733	-0.060	0.442	-0.083	0.286	-0.141	0.120
Campania	-0.033	0.710	-0.055	0.465	0.021	0.787	0.005	0.951	-0.074	0.405
Puglia	-0.006	0.941	0.008	0.911	-0.006	0.939	-0.019	0.799	-0.011	0.896
Basilicata	-0.209	0.024	-0.052	0.512	-0.093	0.249	-0.150	0.063	-0.269	0.004
Calabria	-0.034	0.704	-0.038	0.617	-0.018	0.813	-0.032	0.678	-0.036	0.688
Sicilia	0.011	0.902	0.051	0.499	0.024	0.749	0.018	0.818	-0.030	0.732
Sardegna	-0.028	0.752	0.090	0.223	0.045	0.557	0.005	0.951	-0.039	0.661

Spatial house cost index, SHCI

- Hedonic price method (HPM) that allows to take into account of the structural characteristics of the house, locality/neighborhood and environmental characteristics that indirectly affect the price/rent of a house
- Data from HBS
- The estimations of the SHCI have been done for different typologies of housing, households, and occupancy status: (i) all the occupancy status and only renting occupation: both for poor households and all the households; (ii) all the typologies of house and only the apartments: both for poor households and all the households
- The preliminary results, even with statistical reliability problems of the estimations for three regions, confirmed the significant rent level differences across various Italian regions

Next step

Once we computed properly PPPs for food and beverages and SHCI poverty specific we can adjust the national poverty poverty line:

$$ANPL_r = \gamma_r PPP_r + \delta_r SHCI_r + (1 - \gamma_r - \delta_r)$$

- ANPL_r is the Adjusted National Poverty Line, adjusted for region r
- PPP_r is the exchange rate for food and beverage goods between region r and Italy
- SHCl_r is the spatial house cost index for region r
- γ_r is the share of consumption expenditure for food and beverage in region r
- δ_r is the share of consumption expenditure for housing rent in region r
- Adjusted HCRs can then be estimated using ANPLs

Concluding remarks

- Evaluation of the impact of subnational PLs on the HCRs
- Our results show that the choice of the PL is very relevant when the aim is to compare local relative poverty indicators
- Moreover, the national poverty line can be adjusted to take into account different levels of purchasing power within the country
- Preliminary results show differences in the levels of prices for rent house and for food expenditure (some limitations due to scanner data goods coverage)
- Next steps
 - Refine CDP models, idea: use quantile regression on the whole set of prices, avoiding to many averages
 - Refine hedonic regressions
 - Compute adjusted national poverty lines and estimate local HCRs (using SAE methods)