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The use of alternative data sources to estimate the threshold of absolute poverty in Italy

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### **Abstract**

Since 2005 the Italian national statistical Institute (Istat) compiles and disseminates estimates of absolute poverty based on HBS consumption expenditure data.

The approach adopted is based on the calculation of monetary thresholds that sum up three main components: a food component, a housing component and a residual one. The value of the thresholds varies, by construction, according to the size of the family, its composition by age, geographical distribution and the size of the municipality of residence.

The methodology adopted so far, included that the food component and a small part of the housing one were evaluated using the prices derived from the consumer price survey. The most part of the housing component (that related to rents) was estimated on the basis of HBS data and the residual component was estimated in relationship with the food component via a model of linear regression.

Istat is revising and updating the methodology of estimation of absolute poverty and, in particular, is re-evaluating the thresholds by using the new sources of data that are available in the consumer price survey. Specifically, scanner data for food component and the data base of rental contracts provided by Italian Tax office (a typical admin data source) are adopted to this aim.

Therefore, potentialities of these 2 innovative data sources and some preliminary results obtained in the absolute poverty thresholds estimation are discussed.

## **1. Introduction <sup>1</sup>**

The topic of absolute poverty and its measures is at the centre of the debate of economists and statisticians since long time.

The launch of SDGs (Sustainable Development Goals) has highlighted furthermore the issue of the poverty (and inequalities) as one of the most important issues with the policy makers have to deal with both in the high and in low and middle income countries, even if with different perspectives. After the long period of growth that featured the end of the previous millennium, the first phase of the new one was characterised by three deep crises, that had, amongst the consequences, that of enlarging in Italy the number of people affected by absolute poverty. Therefore, the importance of adopting policies to contrast poverty based on good quality data was stressed furthermore.

In parallel with the evolution of the living conditions of the households through these scenarios, also the statistical panorama has evolved, in particular for what concerns the availability and the use on new data sources, pushed by the digitalization, to measure both economic and social phenomena.

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<sup>1</sup> Introduction is drafted by Cristina Freguja and Federico Polidoro

Focussing the attention on the monetary measure of absolute poverty based on households' consumption expenditures, the room to widen the use of new data sources to improve the measures has become progressively larger.

Since 2005 Istat has been estimating absolute poverty in Italy by using Households' Budget Survey (HBS) (that is carried out continuously). Of course the time elapsed since the first year required to plan a revision or at least an update (given its capability to capture this phenomenon), of the methodology adopted. This is the reason why a scientific commission, chaired by Istat president (professor Giancarlo Blangiardo), was established by Istat at the beginning of 2022 with the participation, of experts and researchers coming from the Italian central bank (Banca d'Italia), Ministries, other institutions, research centres and academia as well as Istat experts.

The Commission, from the very start of its work, has focussed its attention on the availability of new data sources to estimate the thresholds on absolute poverty, in particular scanner data and the data base of rentals for housing provided to Istat by the Italian Tax Office and its real estate market Observatory and that, since 2022, it is used to estimate the inflation rate of this component of Italian Consumer Price Indices (CPI) or Harmonised Indices of consumer prices (HICP) basket.

This paper tries to sketch the main advancements that these new data sources could represent for the absolute poverty estimation, proposing a contribution that the authors (all participating in the scientific Commission aforementioned) wish could be helpful in the international debate. In paragraph 2 the current methodology adopted to estimate absolute poverty in Italy is described, paragraph 3 is focussed on the revision of the methodology in progress and in particular on the use of the new data sources, paragraph 4 traces some main concluding remarks.

## **2. The current methodology adopted to estimate absolute poverty in Italy**

### **2.1 The conceptual approach based on HBS data<sup>2</sup>**

Absolute poverty is a condition in which people are below a certain threshold, based on the definition of a basket of basic needs. This latter refers to the identification of goods and services that, in a given context, preserve individuals and households from deep social exclusion, and to their monetary evaluation. Istat calculates<sup>3</sup> absolute poverty thresholds as the monetary value, at current prices, of a fixed basket of goods and services considered as essential for each household (according to the number and age of its members, geographical area of residence and municipality demographic size) to attain the minimum acceptable standard of living to avoid social exclusion. It is like saying that a household that cannot afford to purchase goods and services essential to meet basic needs cannot even attain an acceptable, although modest, standard of living in the social context in which they live. Actually, this could imply severe forms of social exclusion.

In the approach adopted by Istat, basic needs are identified in; adequate nutrition; availability of a dwelling of adequate size according to household dimension and equipped with heating and main services, durable goods and accessories; minimum necessary to dress, communicate, be informed, move, be educated and be in good health. On the one side, it is assumed that they are homogeneous all over the country (even if there are some differences due to 'external' reasons, such as the climatic conditions in the heating requirement), so that goods and services to satisfy them are the same everywhere in the Italian territory. On the other side, it is also assumed that the costs to meet basic needs may differ in different geographical areas of the country, since they reflect local variations of prices of goods and services in the basic need basket.

The data source for the estimation of absolute poverty is the Household Budget Survey (HBS), carried out by Istat every year, whose main target is represented by all expenditures incurred by

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<sup>2</sup> Sub-paragraph 2.1 is drafted by Ilaria Arigoni and Valeria de Martino.

<sup>3</sup> The methodology for the estimation of absolute poverty was revised last time in 2005 by a Study Commission of experts in the field (see Istat, Methods and Standards Volume, "The Measure of Absolute Poverty", 2009).

resident households to purchase goods and services exclusively devoted to household consumption. As the largest part of consumption expenditure (namely, food and housing) is done at household level, household is the survey unit and household questionnaires are used. For this reason, for the estimation of absolute poverty the reference unit of the basket is the household; from this it also derives the need to define at household level all individual needs (aggregated according to demographic characteristics of individuals and taking into account both potential economies of scale and saving forms that can be realized in different household typologies).

The basic need basket consists of three macro components<sup>4</sup>: food, housing, residual. The evaluation of the monetary value (cost) of each basket component is obtained considering, for single goods and services, the minimum price accessible to all households, bearing in mind that price may differ according to different retail trade channels and geographical areas. The sum of the monetary values of the three different components returns the monetary value of the basket, corresponding to the absolute poverty threshold.

The monetary value of the basket, defined for the year 2005 varies according to number and age of household members, geographical area of residence and municipality demographic size (indeed, there are several absolute poverty thresholds) and it is revaluated every year by specific<sup>5</sup> consumer price indices. It ds.

The methodology for the estimation of absolute poverty defines as absolute poor a household with a consumption expenditure<sup>6</sup> lower or equal to the threshold. Assuming that all household members have the same chance of accessing household economic resources, if a household is defined absolute poor, also all its members are absolute poor.

Two indicators are currently disseminated which summarize information on poverty. The first is the proportion of the poor (incidence), i.e. the ratio between the number of households (individuals) in a condition of poverty and the number of resident households (individuals). The second is the average poverty gap (intensity), which measures "how poor the poor are", i.e. by how much, in percentage terms, the average monthly expenditure of poor households is below the poverty line.

## **2.2 The estimation of the monetary thresholds and their annual update<sup>7</sup>**

The poverty threshold is individually compared with the consumption expenditure of each household; households with monthly expenditures below or equal to the threshold are classified as absolutely poor.

The three macro components of the basket - food, housing, residual (introduced in sub-paragraph 2.1) - are calculated in a different way and then each component is added to the other, because the basket is additive. The monetary value of the overall basket is obtained by direct summing those of the various components and corresponds to the absolute poverty threshold.

The food component is based on the nutritional needs of the individual, varying by age (6 age classes), identified with those officially summarized in the Recommended Intake Levels of Nutrients (RLAs). The food and drink necessities are defined considering the individual calories needed to carry out the usual daily activity, through a nutritional model defined by the National Nutritional Institute by age of individuals.

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<sup>4</sup> See paragraph 2.2 for further details about: the identification of goods and services to add to each basket component; the identification of sources for evaluating the cost of each of the three components.

<sup>5</sup> For goods and services and different geographical areas.

<sup>6</sup> Net of major maintenance and repair of dwellings, premiums paid for life insurance and annuities, mortgage payments and loan repayments, which are not part of household consumption expenditure. Imputed rentals for housing instead are included.

<sup>7</sup> Sub-paragraph 2.2 is drafted by Valeria de Martino.

These nutritional needs are converted into individual food combinations, by age group, expressed in average daily grams for each type of food. This need is supposed to be invariable over time and independent from individual preferences. Data from the 2005 Istat consumer price survey were used to arrive at the monetary valuation of individual food combinations. The evaluation of the monetary value (cost) of each basket component has been obtained considering for single goods and services, at the minimum price accessible to all households, not simply the absolute minimum price, identified at the provincial level and then gradually aggregated down to the regional and national level for each individual product included in the basket.

Adding up the individual components yields the monetary value of the household's food additive basket.

From the additive food basket, the recalculated food basket is obtained by applying the multiplicative coefficients that summarize the effect of saving/non-saving forms of purchasing. This effect was confirmed by the data, in which the average per capita household food expenditure of households in the first fifth (taken from the 2005 Household Budget Survey) decreased as household size increases. Multiplicative coefficients are obtained by studying the additive food basket per capita and the average food expenditure per capita of households belonging to the first fifth.

For housing component, the minimum requirement is defined as a rented dwelling (the minimum dwelling size is given by Ministerial Decree 5/7/1975 that establishes the criteria for habitability) at market prices, given the hypothesis that a family with severe budget constraints does not own a home because it is unlikely to be able to access the financing needed to purchase it, given the lack of the minimum assets needed to take out a mortgage, and that the supply of subsidized rental housing is insufficient to meet the needs of low-income households. In addition, a family does not always have the option of sharing housing with relatives or friends, when necessary.

The dwelling must be equipped with some basic durable goods as refrigerator, cooker, washing machine, TV. It must be taken into account also the energy minimum consumption, estimated by Authority for electricity and gas, by household size and available electrical durable goods and heating, that varies according to climate zone, individual characteristics, and the amount of time family members spend inside the home.

Households must also be able to acquire the minimum necessary to clothe themselves, communicate, inform themselves, move about the area, educate themselves and keep themselves healthy. In the absence of regulations, measures, scientific standards of reference, the minimum expenditure needed to meet them was directly estimated as a residual component (housing items other than those considered in the housing component, health, clothing, communication, transportation, education, other). The residual component, similarly to the food component, varies according to the household composition, both in level and characteristics. In 2005 a linear regression model was estimated, which relates household spending on all goods and services considered in the residual component to spending on food (recalculated to consider the economies of scale). The model also separately estimates the effect due to different household composition by age group of members.

Thresholds for years after 2005 were estimated using consumer price indices specific to subgroups of goods and services to individual expenditure items (the selection of subgroups took into account the characteristics of consumer price collection and their comparability over time). Assuming that consumer price dynamics may differ across the territory, the revaluation of the basket components is done separately by geographic breakdown (North, Center, Southern regions). Revaluation for food, residual and durable goods component, is made by single good changes in the different price indexes in the North, the Center and the Southern regions. For rents, revaluation is distinguished in each of the geographical areas between large and small municipalities (with more or less than 250,000 inhabitants). Finally, for electricity, revaluation is done through a unique national index.

Therefore, there is not a single threshold, but as many absolute poverty thresholds as there are combinations between family type (obtained as a combination of number and age of members), geographical distribution and type of municipality of residence (distinguishing between municipalities in the centre of the metropolitan area, metropolitan area suburb municipalities, and municipalities with 50,001 inhabitants and above and other municipalities up to 50,000 inhabitants (different from metropolitan area suburb municipalities)).

For example, in 2021 for an adult (aged 18-59) living alone, the poverty line is 852,73 euros per month if he lives in a northern metropolitan area, 766.70 euros if he lives in a small northern municipality, 576,63 euros if he lives in a small southern municipality; in 2005 for an adult (aged 18-59) living alone, the poverty line is 694,01 euros per month if he lives in a northern metropolitan area, 623,18 euros if he lives in a small northern municipality, 468,40 euros if he lives in a small southern municipality. Between 2021 and 2005, the increase of threshold value for all examples given is about +23%, equally distributed over the territory.

### **2.3 The estimation of the absolute poverty rate<sup>8</sup>**

As illustrated in the previous paragraphs, Istat (as well as international literature<sup>9</sup>) adopts a purely economic or material poverty approach to measure absolute poverty. The indicator provides an assessment of the adequacy of the means available to the households and not the actual achievement of the goal of a multi-dimensional well-being<sup>10</sup>. In other words, absolute poverty classifies poor/non-poor households according to their potential inability to acquire a basket of essential goods and services.

To provide information on the various aspects of poverty, as already recalled in paragraph 2.1, there are two reference indicators. The first is poverty rate, i.e. the ratio between the number of households in a condition of poverty and the number of resident households. The second is the average poverty gap (intensity), which measures "how poor the poor are", i.e. by how much, in percentage terms, the average monthly expenditure of poor households is below the poverty line.

Absolute poverty thresholds represent the values against which the consumption expenditure of a family is compared to classify it as absolutely poor or non-poor. In 2021 the poverty line, for an adult (aged 18-59) living alone, is 839.78 euros per month if he lives in a northern metropolitan area, 766.70 euros if he lives in a small northern municipality, 576.63 euros if he lives in a small southern municipality.

The threshold is higher for a bigger household but the increase is less than proportional as the result of the forms of savings that can be achieved when the family composition varies. Therefore, the poverty line for a household of five members (aged 18-59) in a northern metropolitan area is 2,047.91 euros per month, 2.4 times the poverty line of a single.

As absolute poverty classifies poor/non-poor households according to their inability to acquire a basket of essential goods and services is considered a reference indicator to verify the impact of economic policies in support of Italian households living under a minimum life-standard level.

Differently the measure of relative poverty, defined considering the average consumption of the population and not a fixed minimum life-standard level, provides an assessment of the inequality in the distribution of consumer spending and identifies poor households among those that are at a disadvantage compared to others. The differences between the two measures when we will later focus on the impact of COVID-19 outbreak on poverty (absolute and relative).

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<sup>8</sup> Sub-paragraph 2.3 is drafted by Federico Di Leo

<sup>9</sup> JRC Research Reports (2021), "Measuring and monitoring absolute poverty (ABSPO) – Final Report," JRC127444, Joint Research Centre.

<sup>10</sup> Stiglitz, J., A. Sen, et al. (2009). Commission on the Measurement of Economic and Social Progress.

In 2019 it was possible to verify the impact of the introduction of the “citizenship income” (which replaced the “inclusion income”) and which benefitted, in the second part of 2019, over a million households. It was estimated that almost 1.7 million households were in a condition of absolute poverty (with an incidence of 6.4%), about 4.6 million individuals (7.7%), significantly less than in 2018 when the incidence was of 7.0% and 8.4% respectively. In particular, in the Southern regions households’ poverty fell from 10.0% to 8.6%, and individual poverty from 11.4% to 10.1%. Even in the Centre, the poverty of resident individuals significantly reduced, from 6.6% in 2018 to 5.6%.

The decrease in absolute poverty was largely due to the improvement in spending levels of poorer households in 2019 (in a state of stagnation of domestic consumption).

In 2020, the year of the COVID-19 pandemic, absolute poverty has increased reaching the highest level since the beginning of the time series (see next paragraph). According to the estimates there were over two million households in absolute poverty (with an incidence of 7.7%), for a total of over 5.6 million individuals (9.4%); a significant increase to 2019 when the incidence was, respectively, 6.4% and 7.7% (Table 1).

While there was an evident increase of poverty rate, the value of poverty intensity was 18.7%, a reduction from 20.3% of 2019 in all geographical areas. This was also due to the measures implemented to support citizens (basic income, emergency income, extension of the Earnings Supplement Fund, etc.) that have enabled households challenged by economic difficulty - both those that slipped below the poverty line in 2020, and those that were already poor - to maintain consumer spending not so far from the poverty line.

The year 2020 was characterized by a reduction of a decrease of inequality. The levels of consumption decreased for all the households but more evidently for those who have higher levels of expenditure. Relative poverty rate decreased from 11.4% in 2019 to 10.1% in 2020.

In 2021, a little more than 1.9 million households (7.5% of the total from 7.7% in 2020) and about 5.6 million individuals (9.4% as last year) were in absolute poverty. Therefore, absolute poverty substantially confirms the historical picks reached in 2020, the year when the COVID-19 pandemic began.

The reason for this substantial stability was due to several factors; in particular, to a more moderate increase in consumer spending by the poorest households (+1.7% for 20% of households with the lowest spending capacity, that is to say almost all households in absolute poverty) which was not enough to compensate for the rising in inflation (+1.9% in 2021) in the absence of which the share of households in absolute poverty would have fallen to 7.0% and that of individuals to 8.8%.

**Table 1. Poverty rate by geographical areas. Years 2019 – 2021. Absolute values and percentages**

	North			Centre			South and Islands			Italy		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
<b>Absolute values</b>												
Poor households (absolute values)	726	943	835	242	290	299	706	775	826	1,674	2,007	1,960
Poor people (absolute values)	1860	2,554	2,255	663	788	861	2,071	2,259	2,455	4,593	5,602	5,571
<b>Poverty rate (%)</b>												
Households	5.8	7.6	6.7	4.5	5.4	5.6	8.6	9.4	10.0	6.4	7.7	7.5
Individuals	6.8	9.3	8.2	5.6	6.6	7.3	10.1	11.1	12.1	7.7	9.4	9.4
<b>Absolute poverty intensity</b>												
Households	20.1	18.1	18.1	18.1	16.1	17.3	21.2	20.3	19.9	20.3	18.7	18.7

## 2.4 The historical and recent profile<sup>11</sup>

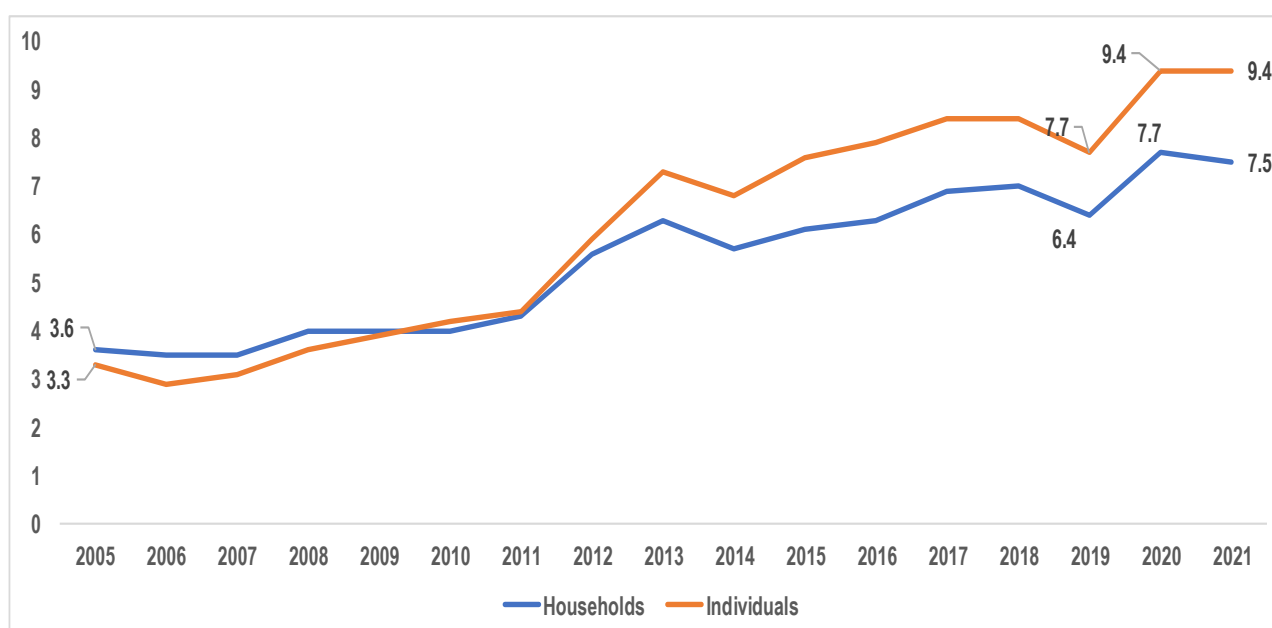
It is quite interesting looking at the historical profile of the absolute poverty rate by households and individuals since the beginning of the available time series (2005) given that the data pass through the three main crisis that have featured the first twenty years of the 2000s.

The economic crisis that affected Italian and world economies starting from sub-prime crisis (with the credit crunch provoked by the impossibilities for the households to deal with the mortgages agreed that transmitted their effects on the real economy) looks to have consequences on the Italian absolute poverty rate not in terms of level but in terms of characteristics of the poor households. As a matter of fact, exactly in 2010 it is the first time that the poverty rate in terms of individuals is higher than that in terms of households. This means that the large families start to be hit by absolute poverty more than the small-size ones. Since then this evidence is confirmed and the gap has been expanding until reaching the value of almost two percentage points in 2021.

Quite the opposite, the sovereign debt crisis means a level shift in the absolute poverty rate in Italy (from about 4% it jumps, in a couple of years to about 6% for the households and 7% for the individuals) and it will increase, with the exception of 2014 (the first of economic recovery also in terms of GDP rate of change) and 2019 (when the effects of the “inclusion income” and of “citizenship income”, both measures to support the poorest families started unfold their effects, sharply interrupted by the pandemic in 2022, followed by a relative stability in 2021 (partly affected by the pandemic yet).

It has to be noticed that the evolution before described took place across years with low inflation rate, with the exception of 2011 and 2012 when also for this reason the absolute poverty increased, bringing to focus the attention on what will happen with 2022 estimations. Moreover, it is interesting to stress that the increase in the rates between 2011 and 2012 was not re-absorbed, despite the decreasing level of inflation with a couple of years (2016 and 2020) of decrease of the general level of consumer prices, meaning that the effects of inflation on the poor are not transitory but produces long term effects. It is an important lesson learnt in sight of the analysis of 2022 data.

**Figure 1. Absolute poverty rates by households and individuals. Years 2005 – 2021. Percentage values**



<sup>11</sup> Sub-paragraph 2.4 is drafted by Federico Polidoro

### **3. The revision of the methodology in progress**

#### **3.1 The institution of the scientific commission and its mandate<sup>12</sup>**

More than 15 years after the start of the estimation of the absolute poverty in Italy on the basis of the new methodology before described, Istat has decided to establish a new scientific commission, chaired by Istat president (professor Giancarlo Blangiardo) to revise or at least update it. The composition of the Commission combines the experts that were involved in the previous one with a new group of researchers and scholars coming, as in the past, from Istat, Bank of Italy, Ministry of Economy and Finance, other institutions, research centres and academia.

The importance of the work of the commission is enhanced by the new context that took place since 2016. As a matter of fact, the Italian law no. 163/2016, established that the equitable and sustainable well-being indicators contribute to define economic policies which largely affect some fundamental dimensions for the quality of life. Therefore, a high level committee selected a short list of indicators to be considered annually in the Economic and Financial Document (DEF) and in the Report to the Parliament.

The complete list of equitable and sustainable well-being indicators, as defined by the aforementioned committee and approved by the competent parliamentary commissions, is considered since 2018 in the Economic and Financial Document that defines economic policies of the Italian government. The list includes 12 indicators, thereof eight were analysed in their recent evolution and four also for the following three years were developed. Amongst these indicators there is also the incidence of absolute poverty assumed as measure of the effectiveness of the measures of economic policy adopted in terms of improvement of the economic living conditions of the households and of reduction of the inequality.

Therefore, the revision/update of the methodology to estimate this indicator assumes a crucial relevance.

#### **3.2 The new data sources to estimate the value of the absolute poverty thresholds<sup>13</sup>**

Since the beginning of the work of the Commission, it emerged that the also considering the methodological framework used to estimate absolute poverty in Italy so far, the new data sources available to estimate some of the components of the thresholds represent a huge news on themselves. In particular, this is clear for the food component and the most part of the housing one (that related to rentals value). For the food component, the possibility to use scanner data (detected by Istat since 2018 to estimate inflation) is available allowing replace for processed food the data coming from traditional data collection. For the rentals within the housing component, the use of the new administrative data source introduced in the compilation of CPI/HICP since 2022 is represents the other opportunity to innovate the estimation of the thresholds moving from the survey data to an almost census data set of information, able to cover in a more granular way the entire Italia territory, different types of contracts and so on.

In the following two paragraphs it is described the possible use of these new data sources to define the thresholds to estimate absolute poverty thereof the scientific commission is discussing. Therefore, the methodological approaches and results illustrated have to be considered preliminary and all of the subject to final assessment and evaluation of the commission whose work will end in 2023.

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<sup>12</sup> Sub-paragraph 3.1 is drafted by Federico Polidoro

<sup>13</sup> Sub-paragraph 3.1 is drafted by Federico Polidoro



### 3.3 Scanner data to estimate the food component of the threshold and comparison with the data coming from traditional data collection<sup>14</sup>

Starting from 2018, Istat has been using scanner data of grocery products (excluding fresh food) in the production process of the Italian consumer price indices<sup>15</sup>. As the result of the introduction of this new source of information, scanner data have replaced the traditional price collection concerning the processed food (as well as the products for personal care and for the cleaning of the house), while for fresh food, prices are still being collected on the field by the price collectors of the municipalities participating in the survey<sup>16</sup>.

The availability of transaction data for processed food, thanks to the granularity of the information provided, offers the possibility to improve dramatically the Italian estimates of absolute poverty thresholds in terms of territorial, temporal and items' coverage. To this aim, however, it is necessary to develop an operational concept of minimum price for the processed food component of the thresholds which is substantially different from the definition based on the information coming from the traditional price collection, which was used in the past and will continue to be used for the evaluation of the minimum expenditure needed for the consumption of the recommended quantities of fresh food by households.

The table 2 shows the lists of the 94 items that are included in the food component of the poverty basket, classified according to the source of information used to calculate their corresponding minimum average price<sup>17</sup>.

**Table 2. Coverage of the food basket by source (scanner data and traditional data collection)**

Source of price information	Items
Traditional price collection (33 items)	<p><u>Cheese</u> (fontina, scamorza, pecorino, grana, parmigiano);</p> <p><u>Bread</u> (loaves, wholemeal bread);</p> <p><u>Meat</u> (beef, pork, turkey, chicken, sausage);</p> <p><u>Vegetables</u> (potatoes, cabbage, green beans, mushrooms, spinach, broccoli, swiss chard, aubergines, tomatoes, pumpkins, zucchini, carrots, celery, fennel);</p> <p><u>Fruits</u> (oranges, mandarins, apricots, apples, pears, peaches, bananas).</p>
Scanner data (61 items)	<p><u>Milk</u> (whole, partially skimmed, skimmed);</p> <p><u>Package cheese</u> (mozzarella, ricotta, yogurt, cream cheese, baby food cheese);</p> <p><u>Package bread</u> (bread rolls, pancarré);</p> <p><u>Pasta</u> (weath pasta, fresh egg pasta, dried egg pasta, stuffed pasta, baby food pasta);</p> <p><u>Cereals</u> (rice, spelt, maize, breakfast cereals, baby food cereals powder);</p> <p><u>Biscuits</u> (cookies, shortbread cookies, baby food cookies, rusks);</p> <p><u>Saltines</u>;</p> <p><u>Package meat</u> (raw ham, cooked ham, baby food meat);</p> <p><u>Frozen fish</u> (squid, shrimps, cod, sea bream, sole, salmon, swordfish);</p> <p><u>Package fish</u> (canned tuna fish, baby food fish);</p> <p><u>Package legumes</u> (lentils, beans, peas, baby food legumes);</p> <p><u>Package vegetables</u> (lettuce, arugula, radicchio, baby food vegetables);</p> <p><u>Package fruits</u> (olives, dried fruits, baby food fruits);</p> <p><u>Eggs</u>;</p> <p><u>Fats</u> (extra virgin olive oil, olive oil, seed oil, butter);</p> <p><u>Ice creams and sweets</u> (ice cream, croissant, bundt cake, pie, chocolate, chocolate cream, jam, honey, sugar).</p>

<sup>14</sup> Sub-paragraph 3.3 is drafted by Alessandro Brunetti

<sup>15</sup> In 2022, scanner data for about four thousand outlets of the main retail trade chains, covering the entire national territory, are collected at item (i.e. barcode) level. On average, more than 18 million price quotes are collected each week to estimate inflation.

<sup>16</sup> Currently, 79 provincial chief towns (out of 107) and 1 municipality with more than 30,000 inhabitants are involved in the territorial price collection.

<sup>17</sup> In some cases, items could be linked to products collected both with the traditional price collection and scanner data. In these cases, to estimate the minimum average prices the idea is to use only scanner data, due to the higher absolute amount of information provided by this source.

### **3.3.1 Minimum average annual price for scanner data collected items**

For the processed food included in the poverty basket, the estimate of the annual minimum average price of the items could be based on the transaction data concerning all the references (identified by barcodes or GTINs) that are actually bought by households during the reference year. The estimates could be compiled at provincial level (107 are the provinces in Italy) and then aggregated by region, using the weighted arithmetic mean, with weight proportional to the resident population of the provinces (used also for the aggregation of CPIs). In particular, for each item included in the basket, the annual minimum average price (at provincial level) could be calculated by selecting, month by month, the subset of GTINs that belong to the left tail (first quintile) of the price distribution. It is possible to carry out the selection on monthly basis with a view to better capturing the high volatility of the transaction data.

Moreover, in order to take properly into account:

- (a) the differences in the pricing policies of the outlets of the different retail trade channels;
- (b) the differences in the size and packaging of the references of a single item that are sold;

the selection of GTINs, for every item, can be done separately for the main homogenous groups of references<sup>18</sup> and for the outlets of the different types<sup>19</sup>.

Accordingly, the monthly minimum average price of each group of references and outlet type, in the experimental work developed within the framework of the scientific commission, are calculated as the weighted arithmetic mean of the prices of the selected GTINs (weights proportional to the quantities sold). For example, for canned tuna fish, minimum average prices are calculated for five different groups (combinations of size and package) of GTINs: three pieces 80 gr cans, single 80 gr cans, two pieces 160 gr cans, single 160 gr cans and single 200 gr cans and for the retail trade channel one by one. The monthly minimum average prices of the different groups of references are then referred to the same unit of measure (grams, in the example above), before being aggregated by groups and by outlet types using the weighted arithmetic mean (weights proportional to the turnover).

### **3.3.2 Estimating the minimum average annual price for the traditional collected items.**

Regarding the items for which the traditional price collection is used, the estimation of the minimum average annual prices has some analogies with the former case:

- (a) the minimum average annual prices are obtained as the unweighted arithmetic mean of the minimum monthly prices;
- (b) the minimum monthly prices are compiled at the provincial level and then aggregated by region using the weighted arithmetic mean, with weight given by the resident population of the provinces;
- (c) the provincial minimum monthly prices are calculated as the weighted arithmetic mean of the minimum monthly prices of the different retail trade channel (weights proportional to the relative importance of the outlet types in terms of turnover).

However, in this case, the minimum prices of the best-selling references (and not of all available references) collected in the sample outlets of the same channel in the province are used to calculate the monthly minimum average price of the single items.

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<sup>18</sup> The homogenous groups of references are defined at the national level and are the same for each province.

<sup>19</sup> Hypermarkets, supermarkets, discounts, outlets with surface between 100 and 400 square metres.

### 3.4 Administrative data of rentals for housing to estimate the housing component of the threshold and the change with the respect to the previous approach<sup>20</sup>

As aforementioned, the housing component takes into account both the availability of a dwelling (i.e., the cost of rent) and the services that the house must contain (i.e., electricity, heating, and some durable goods). The minimum housing requirement is defined through a ministerial decree, which defines the parameters for granting habitability (Ministerial Decree 5/7/1975).

The rent subcomponent accounts for most of the housing component. The estimation model is based on a suitable dwelling size that varies with household size and on price per square meter. To account for the differentiated cost of the housing market in the different areas, the price varies by type of municipality and geographic area of residence.

The current methodology defines the monetary value of the rent component for a household of size  $z$  (expressed in square meters), residing in the geographical area  $k$  and in a municipality of type  $c$  as:

$$ac_z^{kc} = spl_z * \widehat{cm}^{kc} \quad (1)$$

where  $spl_z$  is the suitable surface for a household of size  $z$  (as defined by the Ministerial Decree 5/7/1975) and  $\widehat{cm}^{kc}$  is the estimated monthly expenditure per square meter for rent of households residing in the type  $c$  municipality of geographical area  $k$ .

The parameter  $\widehat{cm}^{kc}$  is estimated through the following model based on HBS 2003-2005 data:

$$cm^{kc} = b_0^c * \exp(-sp^{b_1^c + b_2^c ds}) \quad (2)$$

where  $sp$  is the surface of the dwelling and  $ds$  is a dummy variable which takes value 1 if the household is resident in the South or Islands and 0 otherwise.

Since the beginning of 2022, Istat has the possibility of using the data base of rentals for housing of the Tax Agency (henceforth, also called OMI database), which is a census database on all active rents in Italy at a given time. This database has great potentialities, particularly from three points of view. First, it is a source completely exogenous to the HBS data; second, since it is a census database, it is possible to avoid the estimation of an econometric model, thus avoiding the uncertainty arising from the choice of the model and from the model itself in terms of standard error. Finally, a more disaggregated territorial classification can be considered.

Regarding the first topic, it can be noted that the current methodology is based on an econometric model that uses HBS data and the coefficients estimated on survey data make the methodology somewhat endogenous with respect to the distribution of consumption as measured by the survey, whereas for the absolute approach it would be better to obtain poverty lines that are completely exogenous to the survey data.

Regarding the second point, of course every statistical model is affected by uncertainty. Therefore, the scientific commission is oriented to avoid using a statistical model, given that the cost of rent per square meter is calculated through cells determined by the intersection of dwelling size, territorial domain (geographical area at NUTS I level) and type of municipality. This means that rents are stratified by geographic area, municipality type and class of surface.

Thus, the monetary value of the rent component for a household of size  $z$ , residing in the geographical area  $k$  and in a municipality of type  $c$  could be redefined as in equation (1) where  $spl_z$  is still the suitable surface for a household of size  $z$  and  $\widehat{cm}_z^{kc}$  is no longer the estimated monthly expenditure per square meter obtained from HBS data but the cost per square meter of a dwelling that has surface suitable for a household of size  $z$  residing in the type  $c$  municipality of geographical area  $k$ .

<sup>20</sup> Sub-paragraph 3.4 is drafted by Andrea Cutillo.

As well as the methodology currently in use, the suitable surface defined by Ministerial Decree 5/7/1975 is modified to take into account the lack of small dwellings in Italy (Table 3). Therefore, the Decree’s parameters are replaced by classes of surface, and the central value of the classes are used for obtaining  $spl_z$ . For example, the Decree’s parameter 28 for a one-person household is replaced by the surface class 28-37 square meters, and 32.5 square meters is the suitable surface used for estimates. The “modified suitable surface” is then multiplied by the estimated cost per square meter ( $\widehat{cm}_z^{kc}$ ) in order to obtain the rent threshold.  $\widehat{cm}_z^{kc}$  is identified through the median value of the cost per square meter in each cell as defined by the interaction between  $z$ ,  $k$  and  $c$ .

**Table 3. Minimum size of the dwelling by household size (squared meters)**

	Household size					For every additional component
	1	2	3	4	5	
DM 1975	28	38	42	56	66	+10
Class of surface	28-37	38-41	42-50	56-60	66-70	+10
Central value of the class	32.5	39.5	46	58	68	+10

Source: Ministerial Decree 5/7/1975 and Istat (2009)

Given these premises, the experimental work within the framework of the scientific commission is carried implementing, first of all, a strict selection of lease contracts is applied before stratification. First, only long-term contracts (4+4 years and 3+2 years) are considered. These contracts are the ones usually signed for renting houses to private households. Thus, all short contracts, such as for study or vacation purposes, were excluded. Second, we excluded from the database luxury dwellings, which are not relevant for households in the lower tail of the economic distribution. Luxury dwellings are identified through the land register, and are villas, fine dwellings, and dwellings of historical or artistic significance.

Table 4 presents the results obtained with stratification versus those obtained with the current methodology. The results are disaggregated by geographic area and type of municipality. It can be seen that the overall results are consistent, as the average rent threshold on 2019 HBS data is about the same (334 vs. 333 euros per month). However, there are significant differences when looking at the classification by geographic area (e.g., the average value for the Centre is 408 vs. 392 euros) and, even more, by type of municipality. With the current methodology, the average rent threshold for large municipalities is 402 euros, while using the Omi database it is 482 euros (+19.9%). In particular, the average values for large cities in the Centre are revalued by +29.5%.

**Table 4. Rent component of the poverty threshold by Nuts I level, type of municipality and different methodologies – 2019. Euros and percentage differences**

	Type of municipality			Total
	Centre of metropolitan area	Municipalities of metropolitan area suburbs and municipalities with more than 50.000 inhabitants	Other municipalities	
<b>Current methodology</b>				
North	420	382	331	<b>363</b>
Centre	440	401	345	<b>392</b>
South and Islands	290	268	222	<b>244</b>
<b>Italy</b>	<b>402</b>	<b>355</b>	<b>297</b>	<b>331</b>
<b>Nuts I stratification on Omi database</b>				
North	508	380	320	<b>365</b>
Centre	570	381	315	<b>408</b>
South and Islands	302	264	226	<b>245</b>
<b>Italy</b>	<b>482</b>	<b>346</b>	<b>287</b>	<b>336</b>
<b>Percentage difference</b>				
North	20.9	-0.6	-3.4	<b>0.6</b>
Centre	29.5	-4.9	-8.7	<b>4.1</b>
South and Islands	4.3	-1.4	1.7	<b>0.4</b>
<b>Italy</b>	<b>19.9</b>	<b>-2.6</b>	<b>-3.4</b>	<b>1.5</b>

Bearing in mind that the current methodology is based on a model using data from 2003-2005 and involves annual revaluation of the threshold through specific price indexes, it probably means that major changes in the housing market in recent years have not been captured. For example, a sharp increase in the value of small-scale housing and housing in large cities compared to large-scale housing and housing in small towns in recent years was detected.

In conclusion, the use of the OMI data base is a huge step forward in defining the rent threshold. As aforementioned it avoids the use of a statistical model and makes possible compiling the rent threshold completely exogenously to the HBS data. In addition, it allows to take in account the large changes that have occurred in the housing market in recent years. It also allows for a further step forward, namely the use of a more disaggregated territorial classification. So far, we have shown the results obtained from the stratification obtained through the interaction of dwelling size, geographic area, and type of municipality. However, the OMI database is a census database. Therefore, a more disaggregated classification, i.e., at regional level, is possible. This procedure would certainly imply a multiplication of the number of thresholds, but in our opinion this is an additional advantage. Indeed, when comparing the expenditures of a single record, one is comparing the expenditures of a household that actually lives in that particular region, and thus has a level of spending that as a matter of fact depends on the region of residence.

#### **4. Concluding remarks<sup>21</sup>**

In the previous paragraphs of this paper, the possible innovations in the estimation of the thresholds to estimate absolute poverty in Italy are described.

These innovations are at the centre of the discussion of the scientific commission, chaired by Istat president (professor Giancarlo Blangiardo), in charge of revising/updating the methodology to calculate absolute poverty and are mainly focussed on the use of new data sources (made available in the current compilation of CPIs and HICPs), in particular scanner data and administrative data base of the registered rentals for housing contracts provided to Istat by Italian Tax office through the real estate market observatory.

These new data sources can be used to improve widely the compilation of the monetary thresholds necessary to evaluate if a household is poor or not.

The improvements brought by scanner data are due to the granularity of the information available, to their better coverage of time and territory and to the availability of data on the quantities sold that allows have a measure of the importance, in the households' consumption expenditure behaviour, of the products considered.

The improvements coming from the administrative data set of registered rentals for housing consist of potentialities that are related to a census data base that allow calculate the thresholds of absolute poverty by using a source that is exogenous to HBS data that are considered to evaluate if a household is poor or not.

The first lesson learnt from this scenario is that the advancements obtained in the field of alternative and new data sources for the estimation of CPIs have a lot of possible side effect on the measurement of absolute poverty meant as monetary measure.

The second lesson is that the synergy between CPI, HBS and poverty measures experts is crucial to achieve relevant and growing improvements in the statistical representation of the economic well-being of the households.

The third one in that the new data sources confirm the importance of considering, in the estimation of the absolute poverty, the territorial breakdown at most granular level it is possible.

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<sup>21</sup> Paragraph 4 is drafted by Cristina Freguja and Federico Polidoro

The international context (SDGs) and the national one (absolute poverty rate as one of the indicators of Equitable and sustainable well-being indicators considered in the Economic and Financial Document that defines economic policies of the Italian government), enhances the importance of the use of these innovative data sources.

The scientific commission established by Istat is working on this topic and also on other aspects of the methodology to estimate absolute poverty. The final results of this important commitment will be finalised in 2023 and the next meeting of the Group of Experts on Measuring Poverty and Inequality will be the occasion to present them.

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