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Absolute-poverty, food and housing

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Abstract

Keywords: Absolute-poverty, Food, House, Land, Austerity, Italy
JEL codes: D12, D62, I32, R30

Better nutrition and comfortable housing are complements in the
capability space: however, for the poor and low-income families
food and housing can be substitutes in the commodity space. We take
Engel law to implement a simple food-based measure of absolute-
poverty in a developed country, asking the question of who is paying
the burden of the austerity policies in Italy. Food-based poverty
measures are countercyclical, as well as the Sen index: boom and
bust of housing and land bubble are a further burden on the poor. A
major cause of absolute-poverty comes in the form of a negative
market externality of the housing market: poor families pay "too
much" for housing costs, forcing a constraint on food consumption
for the worst-off. The share of fixed costs, food and housing, in
2013, was 49% for all the three main subsets, shifting upward since
1997. OLS and 2SLS estimates for 10 family types, North and South,
lend support to the substitution effect between food and housing, and
confirm a high degree of heterogeneity, even within the same family
type and geographical area. Children and their families in absolute-
poverty are the most hit group by the economic crisis: young families
lost grounds. Absolute-poverty rates are higher for the families living
in rented houses and with a lower level of education. Negative
housing externalities on poverty could be balanced empowering
women and children for their positive externalities.

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1. *Introduction* [*]

We implement a simple food-based measure of absolute poverty, focusing on the food-housing relationship: we assume a two-stage budgeting process, with food and housing as a fixed cost. Better nutrition and comfortable housing are complements in the capability space, but can be substitutes in the commodity space. We extend the Engel curve relationship to the housing costs.

Hints to the food-housing relation goes back to the end of the XIX century: George Henry writes "The man who now uses coarse food, and lives in a small house, will, as a rule, if his income be increased, use more costly food, and move to a larger house" (1879, IV.III.12), warning about inequality because "What has destroyed ever precious civilization has been the tendency to the unequal distribution of wealth and power …Wages and interest tend constantly to fall, rent to rise, the rich to become very much richer, the poor to become helpless and hopeless and the middle class to be swept away" (1879, X.IV.7) In a similar vein, Tocqueville argued "Almost every revolution which has changed the shape of nations has been made to consolidate or destroy inequality…men whose comfortable existence is equally far from wealth and poverty set immense value on their possessions. As they are still very close to poverty, they see its privations in detail and are afraid of them" (Tocqueville, 1848; 635). Inequality, absolute-poverty and at-risk-of-poverty, have become a central issue of economic policy in contemporary democracies: Tinbergen's race between education and technology (Goldin and Katz, 2008) can erode the social fabric, when economic compensations for the lower skilled are overlooked. Falsifying personal merits for private interests or blind conservatism (Mosca, 1939, 202) further amplify economic distances and lead to a divided "skybox" society (Sandel, 2012, 202).

Piketty and Saez (2003, 2016) show that the family income share of the top 1 percent in the US peaked before the Great Depression in 1928 and before the Great Recession in 2007. The crucial difference between the two peaks is that after 1929 the share declined steadily, while in the aftermath of 2008 the top 1 percent declined only shortly and then regained its peak level of 2007. The burgeoning literature on the top incomes and wealth can be dubbed as inequality from the top: in the same way, the issue of absolute poverty and low consumption, analysed in this paper, can be dubbed as a measure of inequality from below.

Section 2 provides a selected account of the literature related with the relationship between poverty, food and housing, section 3 is a detailed description of the data set, section 4, and its subsections is focused on the crucial patterns of the food-housing relationship, section 5 posits the extension of the to Engel relationship with food to include housing costs, section 6 summarizes the main econometric results of the model selected for 10 family types, in the North and the South of Italy, section 7 analyses economic policy implications.

2. *Poverty, food and housing relationship: a selected literature*

In the US absolute poverty was formally addressed in 1964 by the President Johnson who enacted the "War on Poverty" programs: few years later, however, income inequality began a steadfast increase, with the Gini index jumping from 0.386 in 1968 to 0.479 in 2015. In spite of the economic recovery, after 2008, the household real median income in 2015 (56,516 dollars) was still the same of 1998 (56,510 dollars), degrading the social climate in the regions and States most affected by the past economic crisis. The erosion of middle class, associated to the long run impact of greater inequality on intergenerational mobility, is recognized as a detrimental consequence on the opportunities of upward mobility (Krueger, 2012; Corak, 2013; Chetty, Hendren, Kline and Saez, 2014). The "American Dream" is at stake, as the social bond of a society where everyone has a chance of progressing from the bottom to the top.

In the United States the official poverty rate measure (OPM) is based on a threshold set at three times the cost of a minimum food diet in 1963, updated for inflation and adjusted for family size, but not geographically: a family is "poor" if its pre-tax income is below the threshold. In 2015 the official people poverty rate was 13.5%, lower than in 2014, but still 1 percent point higher than in 2007 (US Census Bureau, 2016). Food security is a related measure: in 2015 12.7% of the households was food insecure, and 5% was very low insecure, both still above the level in 2007 (USDA 2015). The Supplementary Poverty Measure (SPM), still experimental, extends the official food-measure taking into account out-of-pocket spending on selected basic needs, such as food, clothing, shelter and utilities (FCSU). Including shelter is crucial because lead to a significant change of the threshold. For example, in 2015 for a family type of two-adult-two-children the poverty threshold is estimated at 21,806 dollars, if the family has the ownership of its home without mortgage, at 25,930 if it has the ownership with a mortgage and at 25,583 dollars if the family is paying rent. Most poor families paying rent spend over half of their income on housing (Desmond, 2015) and the consequence on their lives can be harsh (Desmond, 2016). SPM is only slightly higher than the OPM for the whole US in the period 2011-2013, but provide a rather different portrait at State level: SPM rate is higher in thirty States, partly reflecting lower housing cost, while the largest increase under SPM as compared with OPM were in States like California and New Jersey with relatively high housing costs (Mattingly and Cook, 2015).

Saez (2016) estimates that 52% of the total growth, over the US recovery period 2009-2015, was captured by the top 1 percent of the US families, leaving therefore the 48% of the total recovery growth to the "bottom" 99%. To highlight what simultaneously happened to the low-income families, we need to look at the entire income distribution. In the United States we can check that, from 2007 to 2015, the total income share of the lowest quintile decreased both in relative (from 3.4% to 3.1%) and absolute terms (with a real money decline), as well as in the second and third quintiles: the real value

increased slightly in the fourth quintile, but the share decreased slightly, while the top 5 percent increased both in real and relative terms, from 21.2% to 22.1% (US Bureau of Census, 2015: 31). The benefits of the recovery were quite unevenly distributed: in absolute and relative terms, the lowest quintiles decreased while the top 5% increased. People in absolute-poverty in the United States did not benefit of the post-recession recovery, with no reduction of the official poverty rates at the pre-recession baseline. Recent research shows that extreme inequality and poverty have a wider impact on the US economy and its social fabric: the "American Dream" is withering because children's prospects to earn more than their parents have fallen from 90% to 50% over the past half century, while internal mobility is hindered by residential segregation, more income inequality, less social capital and family stability (Chetty et al. 2014).

The U-shaped long-term pattern of the top 1 percent for the United Kingdom is strikingly similar to the United States: in both countries top marginal income tax rates were cut most (Piketty and Saez, 2013). If we look to the income distribution in the United Kingdom, relying on the EU-Silc survey, we can measure longitudinal inflows, outflows and permanence by income decile during the European economic crisis, compared with the corresponding pre-crisis pattern: of 100 income earners in the highest decile in 2010, 59 were still present in the same decile in 2013, while of 100 income earners in the highest decile in 2005, 49 were still present three later in 2008. The rate – or probability - of permanence in the highest income decile increased 10 points during the European crisis: moreover, in the United Kingdom the increase of the "distance" between stable "rich" and "poor" – i.e. highest and lowest decile – was the highest between the main European countries (Campiglio, 2016).
An official longitudinal study over the period 1991-2008, reach similar and compatible conclusions: "around 45 percent of individuals who were in the bottom or top quintile in 1991 spent nine or more years in that particular quintile from 1991-2008" (DWP National Statistics, 2010: 10, 15). Official statistics in the United

Kingdom on absolute poverty (also defined absolute low income) use a different methodology with respect to the United States, using as a poverty threshold the households' income below 60% of the 2010/11 median income, uprated for inflation. The crucial difference however is the treatment of housing costs, which includes rent payments and mortgage interest payments, water rates, community water charges, council water charges, structural insurance premiums for owner-occupiers and ground rents and service charges; mortgage repayments are not included as well as costs such as maintenance, repair and contents insurance.

The Department for Work and Pensions (DWP) publishes official poverty estimates in its annual "Households below average income" (HBAI) and income can be measured before or after subtracting housing costs (BHC or AHC) (The Institute for Fiscal Studies, 2014). The issue is crucial because poverty trends and levels are less favourable on AHC basis: in 2012-13 "London has a BHC income poverty rate lower than the UK average, yet the highest rates of AHC income poverty and material deprivation … the rate of absolute income poverty among the children rose when measured AHC but fell when measured BHC" (The Institute of Fiscal Studies, 2014, 5). A further concern regards house heating and the measurement of poverty: in 2013 approximately 10.4% of all English households were in fuel poverty, with the largest increase being for couple with dependent children (Department of Energy & Climate Change 2015, pp. 17).

The absolute measure of poverty in the United States is food-based, relying on the Engel law, while the official measure of absolute poverty in the United Kingdom gives a prominent role to the housing expenditures. The lack of regular nourishment and warm shelter can be assumed as part of the "core of absolute deprivation in our idea of poverty" (Sen 1981, pp. 17, 1983): nourishment and shelter are two main items of this core. There are theoretical and empirical reasons for choosing consumption rather than income as a measure of poverty: consumption is recognized as a better approximation of

permanent income with less measurement errors (Meyer and Sullivan, 2012). Furthermore there are families without, or negative, saving (in Italy households saving rate is negative in the 1st and 2nd decile and is zero around the 25th percentile – our calculations on Bank of Italy's SHIW).

In the wake and after the burst of the housing bubble, after 2008, in the US and some European countries, economic research focused on the land price as a driver of the sharp increase of price in the residential market, considering a house as a composite bundle of structure and land. The remarkable result is that the price of land is much more volatile than the price of the structure and, especially in attractive urban areas, the land weighs more than half of the house value (M.A. Davis and J. Heathcote, 2007; M. Piazzesi and M. Schneider 2006; K. Knoll, M. Schularick and T. Steger, 2017).

3. *Data description*

Italian National Institute of Statistics (Istat) carries out regularly a survey on consumption expenditure behavior of households residing in Italy: the statistical sample select about 20 thousands households and provide information on the average consumption and its structure by major categories.

Istat also computes an absolute poverty measure: households in absolute poverty are those whose consumption is below an exogenous threshold. Absolute poverty thresholds are based on a remarkable fine grid of thresholds obtained summing the minimum costs for food, rents, durables, electric power, heating and miscellaneous. The grid selects 38 family types for 3 geographical areas (North, Centre, South), further distinguishing rents by 3 city sizes, within each geographic area. Istat measure absolute poverty rates since 2005.

A selection of the official thresholds – monthly consumption values - for the family type of 2 adult and 2 children living in metropolitan areas in 2013 is summarised in table 1.

Table 1 - *Absolute-poverty official thresholds*

Thousands euro-2013	Metropolita area		
Monthly consumption	North	Center	South
Food	520	461	449
Housing metro-area	518	556	322
Heating	93	85	40
Durable good	7	7	6
Electric power	30	30	30
Residual	364	328	325
Official threshold	1.532	1.466	1.172

Source: our calculation on Istat information service

In alternative to the official measure, we define a different threshold based on food basic needs, deemed to be a quite accurate and stable measure of basic nutrition intakes (Istat, 2009; 29), to be compared with the actual food consumption. The reference threshold is the same computed by Istat, on a detailed selection of family types. The food threshold was associated to each household in the sample and then compared with the actual household food consumption. The latter is defined as total expenditure in food and beverages, including also expenditure in canteens, bars and restaurants. Households whose total food expenditures are below the food threshold are members of the poverty-set. Out of these families, those whose food consumption is below 70% of the threshold are members of the set of families in absolute-poverty: these stricter thresholds allow for a closer focus on the poverty distribution inside the set of the first four consumption deciles, and the combined effect of the food and housing cost, taken as fixed costs. In this way we also select a subset of families, in the lower consumption and income deciles, with low or negative saving, predominantly living in rented houses and paying out-of-pocket house rent. According to the Survey on Households by the Bank of Italy (SHIW) the proportion of families owning their house of residence, in 2014, is about one third in the first income quantile, and 90% in the two upper income quantiles.

Therefore, according to the Istat measure, a family with 2 adults and 2 children living in the North is officially in poverty if its consumption value is below 1.532 euro: on a food basis, instead, a family is in the poverty-set if its food consumption is below 520 euro in the North. We concentrate on out-of pocket expenditures and therefore imputed rents are not included in housing costs and total consumption, while food consumption includes both at home and outside expenditures. We consider detailed data for each family from 2007 to 2013 for the analysis in section 4: for the econometric estimates in sections 5-6 we select family data in 2013, the bottom year of the second recession.

We take Engel law as a reference to measure poverty and implement a food-based measure of the poverty-set, jointly with housing cash expenditures, on the sample of 20,000 families: the poverty-set is the union of the families in absolute-poverty and the families at-risk-of-absolute-poverty. The difference between the two sets - the families in the poverty-set less the families in absolute-poverty - is taken as a measure of the families at-risk-of-absolute-poverty (see figure 1). We assume a two stage budgeting, between fixed and discretionary expenses, taking food and housing as the main components of the fixed-costs (Deaton and Muellbauer, 1980).

4. *Poverty, food, housing and the European economic crisis*

4.1. Size of absolute-poverty and at-risk-of-poverty in Italy

Our population can be split in two sets of well-off and worst-off: the worst-off can be further divided in families in absolute-poverty and families at-risk-of-absolute-poverty. In 2013, the number of families in absolute-poverty was 2.4 millions, higher than the official Istat estimate of 1.6 millions, not surprisingly given our procedure, which is based only on food requirements, and then relies on actual consumption values of the poor, rather than making difficult estimates for the other items (like housing costs). The number of families in absolute-poverty in 2007, before the crisis, was 823 thousands with the (new) Istat measure and 1.5 millions with the

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food-based measure: absolute-poverty increased with both measures, +96% with the official measure and +59% with the food-based measure.

While the number of families in absolute-poverty, food-based, increased +59%, from 2007 to 2013, also the families at-risk-of-absolute poverty increased +35%. Moreover we could estimate that, from 2010 to 2013, net negative transitions of one income decile, moved one step downward from the 2nd to the 4th decile, as a consequence of the austerity (Campiglio 2016). According to our food-based measure, in 2013 there were 2,4 millions families in absolute-poverty and 3,4 millions were families at-risk (table 2): from 2007 to 2013, families in absolute-poverty in the South recorded the highest increase and families at-risk also increased significantly in the North.

Most recent official data (Istat) show a further increase of the families in absolute-poverty: after a slight decrease, from 1,614 thousands families in 2013 to 1,470 thousands in 2014, in 2015 the number of families rose again to 1,582 thousands. The food-based measure should follow suit.

Families in absolute-poverty and at-risk, paid a heavy toll to the austerity policies.

Table 2 - *Absolute Poverty (food-based) - Number of families (thousands)*

Years thousands	Absolute-poverty			At-risk		
	Italy	North	South	Italy	North	South
2007	1.502	840	447	2.501	1.283	792
2008	1.776	930	592	2.796	1.406	960
2009	2.050	1.111	650	3.036	1.446	1.115
2010	1.867	1.019	593	2.893	1.428	1.004
2011	1.850	913	613	2.881	1.455	955
2012	2.230	1.156	752	3.181	1.567	1.142
2013	2.386	1.162	856	3.369	1.602	1.223
Δ%13/07	58.9	38.3	91.5	34.7	24.9	54.4

Source: our calculations on Istat Households Budget Survey

Figure 1 - *Data set - partition of the well-off and the worst-off*
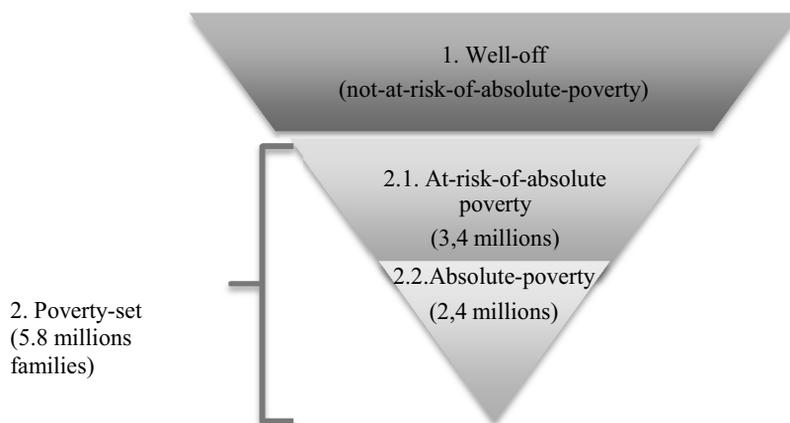
4.2. Poverty rates, Sen Index and the curse of the house bubble

A poverty measure should capture to what extent economic policy does (or does not) counteract the economic downturn caused by the economic cycle or the boom and bust of the housing bubble. We find that the changes of poverty rates (food-based) moved countercyclical with the rates of change of the households' private consumption (figure 2): poverty rates upsurge in 2012-2013, during the second Italian recession, signal how beneficial an effective safety net would have been be for the "poor", and especially for the families with children: indeed, in the absence of a policy for the families in absolute-poverty and at-risk, the total real consumption of the families with children fell about 20% from 2007 to 2013 (Campiglio, 2016). Families in the poverty-set, absolute-poverty and those at-risk, are the more sensitive to economic downturn (table 2).

If we look to the poverty levels we can summarise three different information in a single measure, following Sen's (1976) seminal contribution, which devises a single index combining three basic measures of absolute poverty, namely the poverty rate H (head-count ratio), the food consumption gap (C) with respect to the food threshold of each household, and the Gini coefficient of the poverty set (G_p), to obtain the Sen poverty index (P) defined as $P = H[C + (1-C)*G_p]$. The Sen index (figure 2), which takes into account the most relevant dimensions of poverty, increased sharply between 2007 and 2013, for the families in the poverty-set and in absolute-poverty.

Figure 2 - *Poverty-set and absolute-poverty*

Δ Absolute-poverty and poverty-set (food-based)
Δ % Households' private consumption

Poverty-set — Absolute-poverty •••• HH private consumption
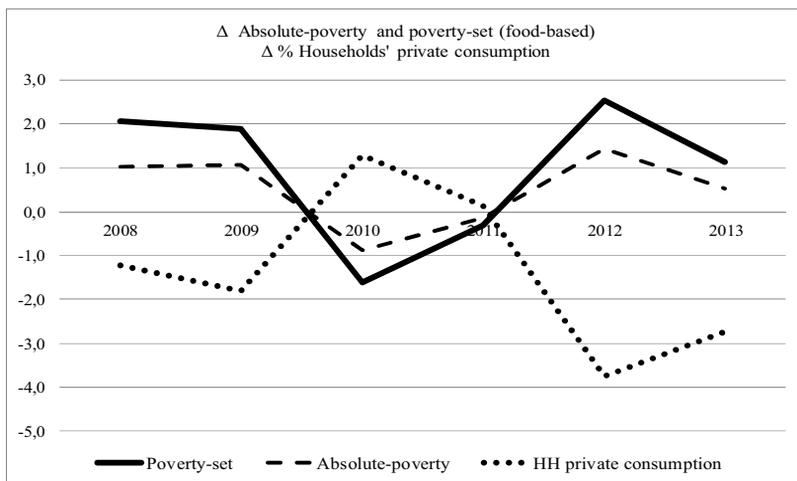
Source: our calculations on Istat Households Budget Survey

Figure 3 - *Sen poverty index - Italy*

Sen index: poverty-area and absolute-poverty

poverty-area (left)" •••• absolute-poverty (right)
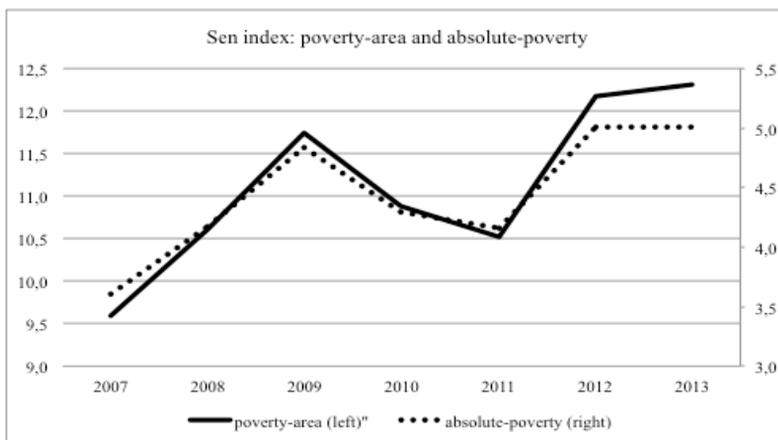
Source: our calculations on Istat Households Budget Survey

The economic impact of the housing bubble in Italy has not been adequately appreciated: the real estate market is however crucial for the whole economic activity and represents a significant share of the total bank loans to the households. The burst of the bubble and the following economic crisis and austerity, prompted an upsurge of house forfeitures, which have precipitated many families at-risk in absolute-poverty. The pattern of the housing bubble in Italy has been common to other countries, the price of land driving the rising prices of the residential market, but at a slower pace. The land value we estimate (figure 3), is obtained as a difference between the house value including land and transaction costs (Istat) and the value of the structure (Eurostat dwellings): we estimate the land value in Italy at 3 thousands billions in 2015, 53% of the total house value, after a 60% peak in 2008. Competition for closer and better amenities, like school, shops, medical services, transports and the time spent commuting to and from work, is a major driving force of land price. We conclude that housing and land bubbles are a further burden on the poor: during the boom because housing costs increase and during the bust because, as a consequence of the following crisis and austerity policies, houses of families at-risk and in absolute-poverty have been forfeited and people evicted.

Figure 4 - *Housing and land bubble - Italy*

Italy –current values houses, land and structure (current billions)

dwellings (left) • • • • • • land (left) House (right)
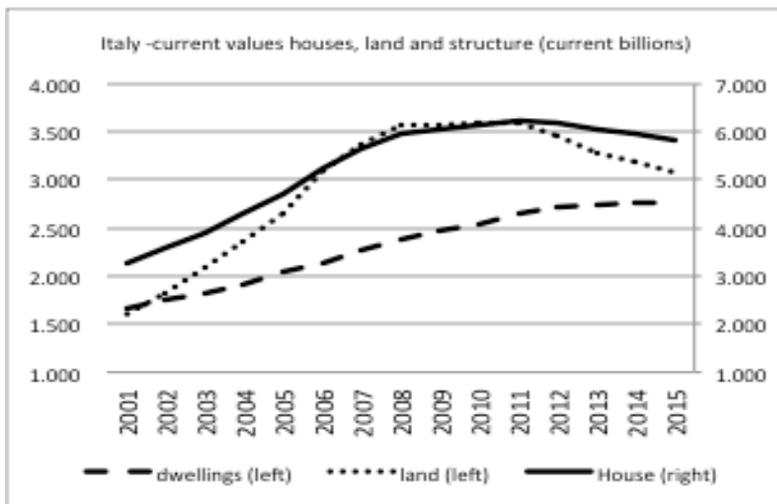
Source: our calculations on Istat Households Budget Survey and Eurostat

4.3. Food, housing expenditures, poverty: North and South

In 2013, the official absolute-poverty was 6.3% (6.1% in 2015), lower than the 9.3% with the food-based measure of absolute-poverty.

The poverty-set - 22.5% food-based - include families surely in absolute-poverty, and – as a difference – an estimate of those at-risk. Families in the poverty-set (absolute-poverty + at-risk) can be better compared with the economic strain of "making ends meet with great difficulty" from the Eu-Silc survey (figure 5). In 2013 the rate for the total population, was 18.8% in Italy and, remarkably, 18.6% in Spain, 4.6% in France and 3.0% in Germany. The measure is pro-cyclical in Italy, Spain and Germany, decreasing from 2013 to 2015: furthermore, a cross-section of the European Union countries shows that the measure of "making ends meet with great difficulty" is strongly correlated with relative poverty, Gini inequality and

economic strains, like inability to a regular nutrition and inability to face unexpected expenses (Campiglio, 2016).

Figure 5 - *Poverty rates and "making ends meet with great difficulty"*

Poverty rates (food-based): absolute-poverty and at-risk (% hh)
Households making ends meet with great difficulty - (% population)
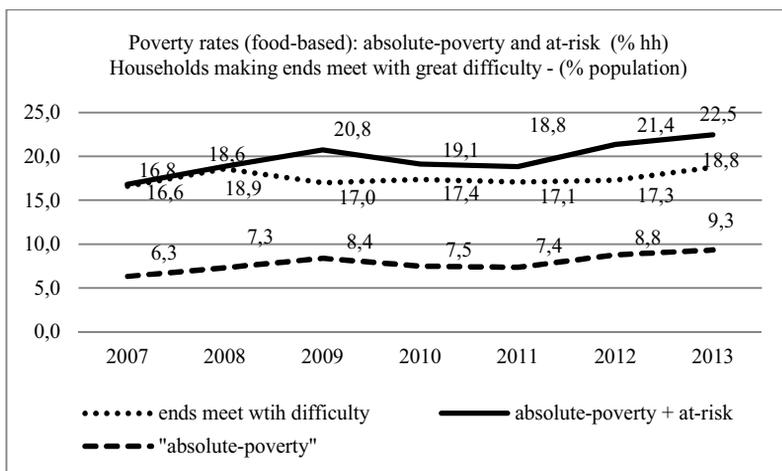
Source: our calculations on Eu-Silc – "Inability to make ends meet" - Extract 24.11.2016

After 2007, the consumption pattern of the families in absolute-poverty changed sharply: the share of food and housing expenditures, taken as fixed costs, increased almost 11 percentage points for the families in absolute-poverty and about 5 percentage points for the families not in absolute-poverty. The burden of the crisis has fallen mainly on the families in absolute-poverty. House expenditures (rent, utilities and maintenance) were the main culprit of the total consumption reshuffle (table 3).

As a consequence, all the other categories of consumption expenditures were reduced, mainly transportations of the families in absolute-poverty. Real total consumption of the families in absolute-poverty fell 18%, from 2007 to 2013, while the total consumption of

the families not in absolute-poverty was 73% higher than the absolute-poor, over the period 2007-2013.

The central role of the food-house interaction, to explain poverty, is still more evident if we compare North and South Italy (figure 6). The North gap between the lower official poverty rates and the higher food-based poverty rates is large: the South gap is instead more limited.

Table 3 - *Not-absolute-poverty and absolute-poverty:*
consumption structure: 2013-2007

Consumption	Not absolute-poverty % 2013	Not absolute-poverty % 2007	2013-2007	Absolute-poverty % 2013	Absolute-poverty % 2007	2013-2007
Food	29.5	28.5	1.0	18.8	14.7	4,1
Apparel	5.7	7.7	-2,0	4.9	8.2	−3.3
Housing	20.3	16.1	4.2	31.0	24.4	6,7
Furniture	5.7	7.0	−1.3	4.0	5.8	−1.9
Health	4.5	4.9	−0.4	4.2	4.5	−0.3
Transportation	17.3	17.8	−0.5	19.3	22.9	−3.6
Communication	8.5	9.1	−0.5	8.9	9.6	−0.7
Miscellaneous	8.4	9.0	−0.6	8.9	9.9	−1.0
Total	100	100		100	100	
Consumption yearly (000)	24,1	25,1	Δ% -4%	13,9	14,5	Δ% -4%
Food + Housing	49.8	44.6	5.3	49.8	39.1	10.7

Source: our calculations on Istat Households Budget Survey
HICP index: 2007-2013 Δ% +14.2%

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Figure 6 - *Absolute-poverty rates – Istat and food-based –*
North and South
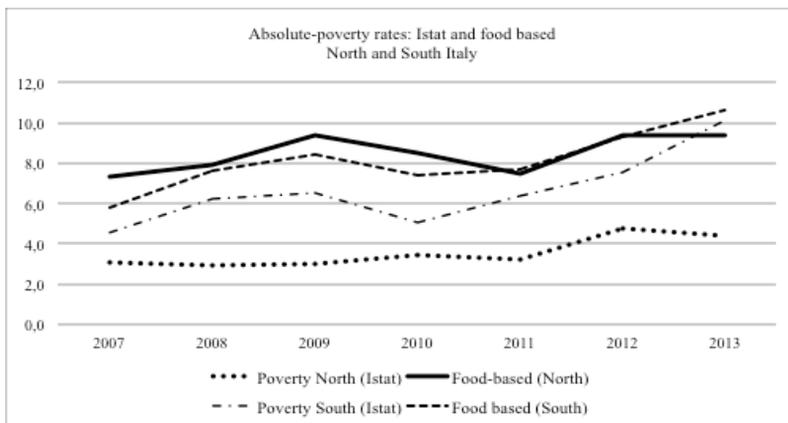
Source: our calculations on Istat Households Budget Survey

The major consequence is that the food-based poverty rate in the
North is similar to the one in the South. This should correspond to a
similar average value of food consumption, and indeed the
consumption values confirm this fact: however the value of the total
consumption in the North is higher than in the South and,
correspondingly, the food share in the South is higher than in the
North.

With the food-based measure the absolute-poverty rate in the North
is quite close to the corresponding rate for the South, while the Istat
official measure shows a higher rate in the South than in the North.
The deceptive paradox of North-South's poverty rates can be
explained if we disaggregate total consumption in the main
categories between North and South, before and after the crisis.

Table 4 - *North-South annual consumption of the families in absolute-poverty 2013-2007 (€ thousands)*

Consumption	2013 - absolute-poverty				2007 – absolute-poverty			
Item	NORTH year (000)	SOUTH year (000)	NORTH share %	SOUTH share %	NORTH year (000)	SOUTH year (000)	NORTH share %	SOUTH share %
Food	2,7	2,6	15.7	25.4	2,1	2,2	12.7	20.7
Apparel	0,9	0,5	5.0	5.2	1,3	1,0	7.5	10.0
Housing	5,3	2,9	31.4	28.5	4,3	2,3	25.2	21.7
Furniture	0,7	0,4	4.3	3.8	1,1	0,6	6.3	5.6
Health	0,7	0,4	4.4	4.1	0,8	0,4	4.5	4.3
Transportation	3,1	2,1	18.5	20.5	3,9	2,1	23.3	20.2
Communication	1,6	0,7	9.3	7.4	1,6	1,1	9.3	11.0
Miscellaneous	1,9	0,5	11.3	5.0	1,9	0,7	11.3	6.6
Total	16,8	10,0	100	100	16,9	10,4	100	100

Source: our calculations on Istat Households Budget Survey
HICP index: 2007-2013 Δ% +14.2%

In 2013 the value of total consumption for the families in absolute-poverty in the North was almost 70% higher than in the South, but the value for food consumption was about the same. The major differences are for house and transport expenditures: housing expenses of the families in absolute-poverty in the North were more than 80% higher than in the South, accounting for more than 1/3 of the higher total consumption value in the North. A proviso is that heating expenditures are higher in the North, where the share of families on rent was also slightly higher, while it is more difficult to disentangle the quality dimension of the houses. Between 2007 and 2013 the share of housing expenditure increased 6 point in the North and 7 points in the South, while also the share of food expenditure increased 3 points in the North and 5 point in the South, a signal of a reversal of the standard of living, confirmed by a real consumption fall of 15% and 19%, in the North and the South. Transportation expenses fell 5 points in the North and nil in the South,

communication and education expenditures fell 4 points in the South and nil in the North (table 4).

4.4. Housing expenditures externality of the absolute-poverty

It is crucial to focus on out-of-pocket housing costs - which include rent, heating, electric power, gas, water, condominium costs, insurance, ordinary maintenance, cleaning and refurbishing – because it is a big chunk of total consumption, for which the expenditure of the families in absolute-poverty is only slightly below the expenditures of the well-off families. With the exception of the rent, also homeowners pay these costs, and a possible mortgage, not included being a capital cost: also local taxes are not included.

The pattern is consistent for all the relevant family types: for the family type of 2 adults and 2 children, the total consumption of the families in absolute-poverty is 46 % less than the better well-off, the food consumption is 64% less, while the housing expenditures are only 14% less (figure 7). The same happens for the families at-risk.

Housing costs of the more well-off act as a constraint on the food consumption of the poor: therefore families in absolute-poverty suffer the burden of a negative pecuniary externality from the more well-off, and the housing costs for the families in absolute-poverty or at-risk can be treated as exogenously given.

The share of housing expenditures, on total expenditures, went through a sharp shift for all the consumption levels, over the period 1997-2013 (figure 8, for some selected years). The pattern of the relationship is rather similar to the food expenditures, highest in the lowest decile and thereafter declining, however with an upward turning point in the 10th decile, slight in 1997 and more pronounced in 2010 and 2013. Between 1997 and 2013 the share of housing expenditure increased 3 points in the 1st decile, 6 points in the 4th and in the 10th and 5 points on average in the other deciles (figure 8).

Figure 7 - *Housing costs for absolute-poverty and not-in-absolute-poverty: family types*
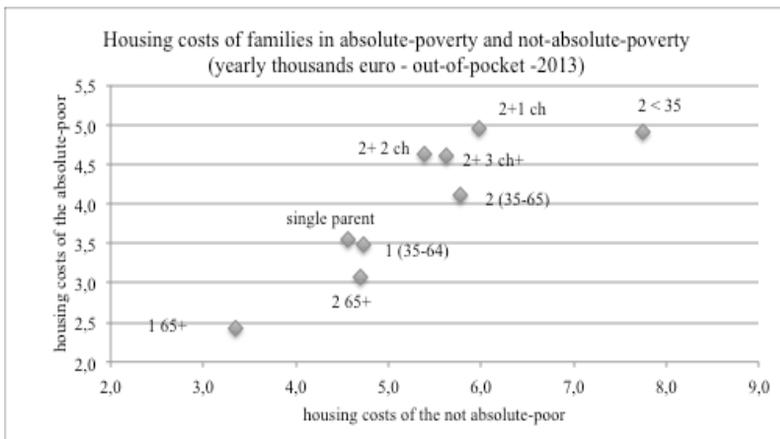
Source: our calculations on Istat Households Budget Survey

Figure 8 - *Housing expenditures (out-of-pocket) in Italy – 1997-2013*
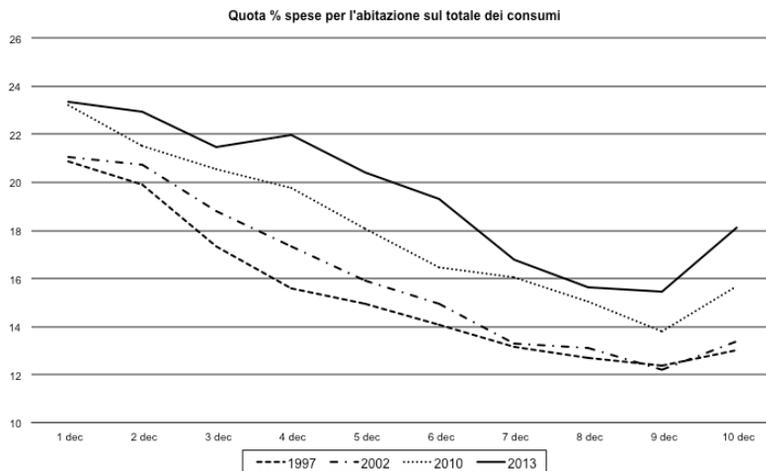
Source: our calculations on Istat Households Budget Survey (various years)

Figure 9 - *Food expenditures in Italy – 1997-2013*

Share of food expenditures on total consumption
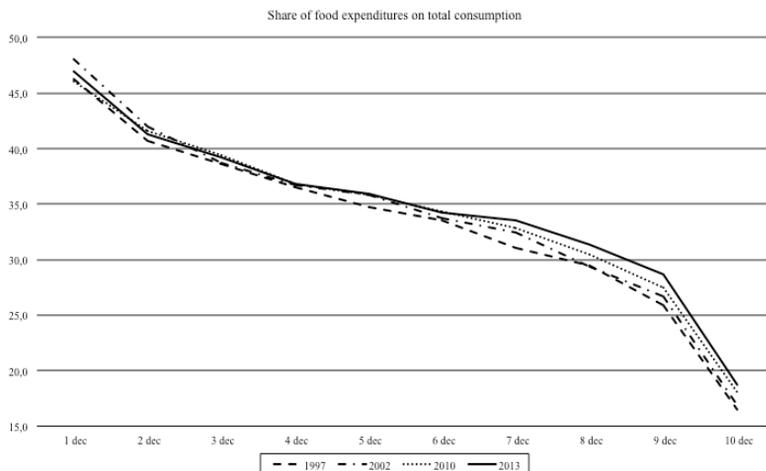
Source: our calculations on Istat Households Budget Survey (various years)

Figure 10 - *Fixed costs (food + housing) in Italy 1997-2013*

Share of fixed expenditures (food + house) on total consumption
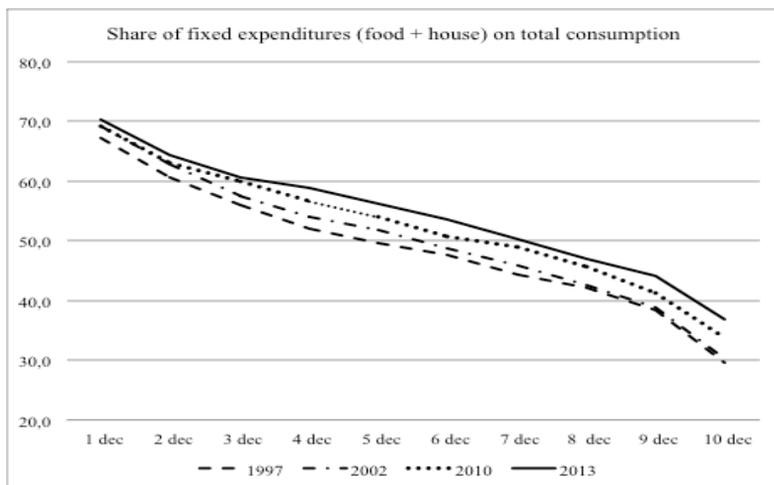
Source: our calculations on Istat Households Budget Survey (various years)

The food share relationship is instead much more stable, and until the 5th decile the overlapping of the monotonically decreasing curves, for the selected years, is almost indistinguishable (figure 9).

The sum of food and housing expenditures can be jointly defined as a fixed-cost, in the short run for food expenditures and in the medium run for the housing expenditures, given the length of the rent contracts or mortgages (not included): moreover the cost of relocation is much higher than the cost of changing or modifying a food bundle. Average fixed costs have shifted upward for all the deciles of the total consumption distribution: the increase between 1997 and 2013 has been remarkable, almost 6 points of total consumption, reducing correspondingly the opportunities for other consumption categories (figure 10).

4.5. Fixed costs and fixed shares: the 49% threshold

We can measure the mean consumption looking to the aggregate values, as we did in the previous section, extending the measurement to the partitions of our analysis: in 2013 the households' fixed cost were 49% of the total consumption. The interesting result is that the average value of 49% for the fixed costs is the same for the entire sample and all the relevant partitions we defined, but not the corresponding shares for food and housing: indeed we observe a linear negative relationship for all the partitions (figure 11). It is worth noting that the average is computed as a ratio between the aggregate values of food and housing costs to the total consumption, rather than an average of percentage shares, which were instead used to estimate the density of the shares distribution.

The families in the set of absolute-poverty spend 30.9% of their total consumption to pay for the housing expenses and 17.5% for the food (in total 48.4%): for the more well-off families the proportions are reversed, 19.8% for the housing expenses and 29.9% for the food (at home and outside, which include restaurants, bar and canteens). The average expenses values for the housing costs are the same for the main partitions, confirming house negative externality: instead food

consumptions differ, depending on family characteristics. If we look to the tail distribution of fixed-costs, rather than the average, their share jumps to 70% (table 5). It is not stretched to assert that the housing expenses are a constraint for the food consumption of the poor, which are instead a choice for the well-off families.

These results apparently do not fully agree with Engel curve: the food share for the well-off is 7 points higher than the families at-risk and 12 points higher for those in absolute-poverty. However we only deal with the statistical distribution of the food-housing relationship, without taking account of their characteristics: family size, in the 10th decile is double then in the 1st. Age also matters, food necessities being higher for the younger rather than the old. Our partition in 10 family types (section 5) takes into account all the relevant characteristics of the consumption behavior for food and housing. But, the main explanation has to be related to the sweeping change of the food consumption habits since the first Engel formulation in the mid-1800s, when the fixed-costs for the "poor but independent" were 81% (Chai and Moneta, 2010). Nowadays, even if eating at home cost less, food consumption away from home is more common and relevant: 14% of total food consumption in Italy (43% in the US), ranging from 4% in the 1st consumption decile, to 21% in the 10th. The "satiation point" for the well-off cost more: we know the value of food consumption values, but not prices and quantities. Families in the 10th decile buy more expensive food, even if the quantity is the same: the cost of lunch and dinner at restaurants, for leisure or business, is even more higher. To the opposite, families in absolute-poverty eat food of lower quality, or less quantity, at a lower price, given the constraint of housing cost and low income.

Table 5 - *Share of fixed costs (food and house) for the poor*
and annual consumption values

	Partitions	No. Obs.	share % housing	share % food	share % fixed cost	Tot. cons. € (000) year	Housing € (000) year	Food € (000) year	Fixed costs € (000) year
1+2	total sample	20.531	20,5	28,6	49	23,5	4,8	6,7	11,5
1	well-off	15.788	19,8	29,9	49,7	25,6	4,9	7,7	12,6
2	poverty-set	4.743	27,6	21,1	48,7	16,4	4,5	3,5	8,0
2.1.	at-risk-ab.pov.	2.805	25,7	23,2	48,9	17,5	4,5	4,1	8,6
2.2.	absolute-poverty	1.938	30,9	17,5	48,4	14,7	4,6	2,6	7,1
2.2.1.	sh_house>30%	830	51,3	16,2	67,4	15,0	7,7	2,4	10,1
2.2.2.	sh_house>40%	570	58,3	15,3	73,5	15,4	9,0	2,4	11,3

Source: our calculations on Istat Households Budget Survey

Figure 11 - *Share of food and housing relationship*
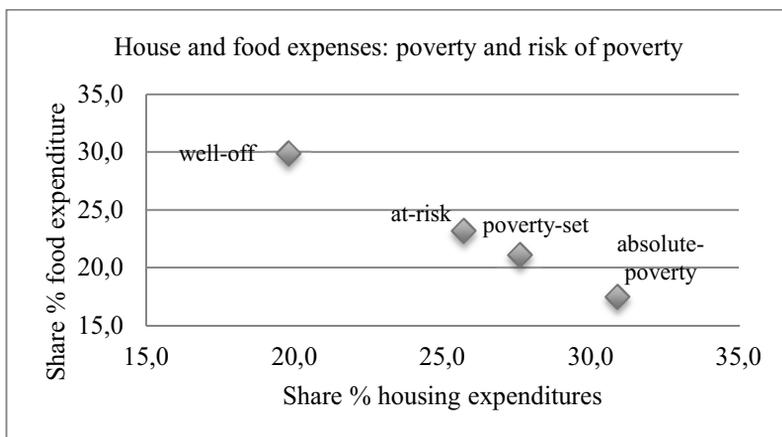
Source: our calculations on Istat Households Budget Survey

Figure 12

Share of fixed costs on total consumption (food and house)
(full sample)
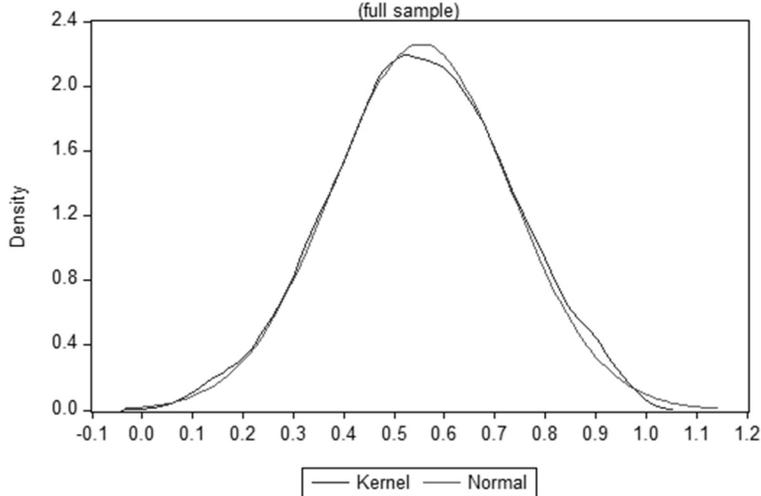
Figure 13

Fixed cost "absolute poor"
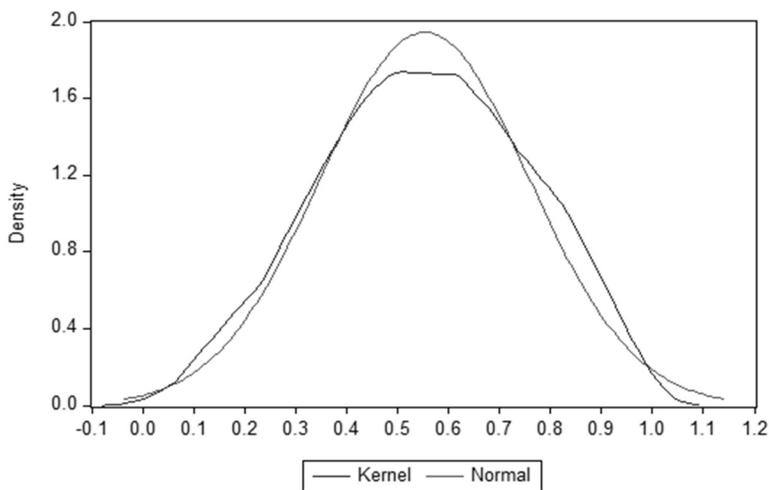
We can be more precise and check the complete statistical density of the share of fixed costs, for the entire sample and the smaller set of the people in absolute-poverty: the kernel of the entire sample approximates closely a normal distribution (figure 12), as it does, slightly platykurtic, for the absolute-poverty set (figure 13). The density for the share of the absolute-poverty shows the importance of the Sen intuition in formalising his index, which includes the inequality within the set of people in absolute-poverty. The density highlights the fundamental issue of heterogeneity: the families whose fixed costs lie to right of the average are indeed worrying because their share of fixed costs is "too high". The last two lines of table 5 show two smaller partitions, for the people in absolute-poverty with a share for housing costs greater than 30% and 40% of the total consumption: food consumption seem to reach a bottom of 15% and the shares of fixed cost raises to 67% and 73%.

4.6. House entitlement and education levels

Families paying rent bear a higher risk of poverty than the families who own their house, with and without mortgage (figure 14): the higher vulnerability of families living in rented houses has, in turn, two major explanations, both underlying a low level of disposable income: unemployment and low level of education (figure 15), often socially inherited from low-income families.

Figure 14 - *Absolute-poverty rate by house entitlement*

Absolute-poverty rates by house entitlement
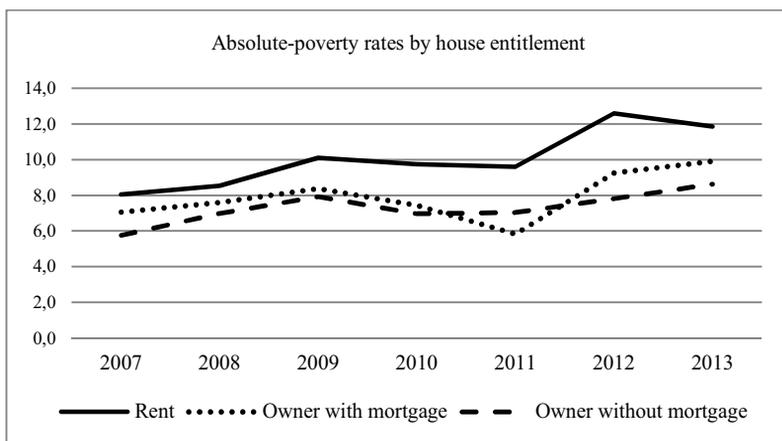
Source: Source: our calculations on Istat Households Budget Survey

Tackling with the housing cost does not address, by itself, the major causes of the increasing poverty, namely unemployment and "bad-breaks", when they entail unexpected needs not backed by adequate income: the life rupture of a long spell of unemployment can precipitate a shift to persistent poverty or a poverty-trap, just when health care is truly needed.

Therefore, decent housing is a basic shelter against misfortunes, whose access – both rented and private ownership – should be publicly supported, because it is a node of widespread social externalities. Poor health can be caused by "dwelling with a leaking roof, damp walls, floor or foundation or rot in windows frames, lacking adequate heating": Eu-Silc statistics on housing deprivation in 2015 (extracted 31.01.2017), show that in Italy the problem is worrying, 32% of the population below the relative poverty threshold living in this situation; only the relatively poor in Hungary, Latvia, Slovenia, Cyprus and Portugal have a worse condition. Italy worsened its situation from 2007 to 2015, together with Hungary, Belgium, Denmark, Portugal, while instead Poland, Romania,

Estonia, Czech Republic, Lithuania, Bulgaria, Netherlands, Spain and Greece improved.

Figure 15 - *Absolute-poverty rates by educational level*

Absolute-poverty rates by education level
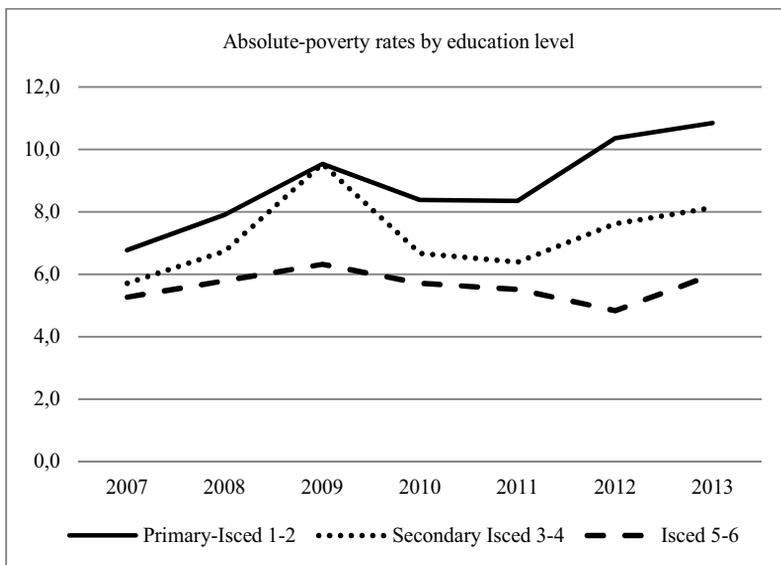
Source: Source: our calculations on Istat Households Budget Survey

The relationship between food, housing and poverty is increasingly recognized: a report in the UK (JRF 2013: 32, 5), remarks that "After more than a century's research in the field, housing circumstances have been shown to be important for health"; "housing cost constitute the most important and most direct impact of housing on poverty and material deprivation", and "the number of people in 'housing-cost-induced-poverty' (not experiencing poverty until housing costs are taken into account) has increased in the past two decades".

Housing expenditures are a node of widespread externalities, like good nutrition, health and life expectancy: housing costs higher than 30% of income in the US, have been proved to increase odds of food insecurity, while rent arrears are positively associated with food

insecurity (Kirkpatrick and Tarasuck, 2011). A debate has been raised by a research documenting a "marked increase in the all-cause mortality of middle-aged white non-Hispanic men and women in the United States between 1999 and 2013. This change reversed decades of progress in mortality and was unique to the United States" (Case and Deaton, 2015). The National Center for Health Statistics (2016) show a similar trend in recent years: in 2015 life expectancy (e_0) decreased slightly from 78.9 in 2014 to 78.8 in 2015 (for males from 76.5 in 2014 to 76.3 in 2015 and from 81.3 to 81.2 for females). Research on the relationship between life expectancy and income inequality show that in the US the expected age of death in the top 1% of income at the age of 40 is 14.6 years higher than those in the bottom 1% of income (Chetty, Stepner, Abraham and Lin, 2016).
Also in Italy life expectancy for males decreased from 80.3 in 2014 to 80.1 in 2015 and for females from 85 in 2014 to 84.7 in 2015. New official data (Istat) are available on the life expectancy by level of education, raising the issue of health inequality: in 2012 men with tertiary education had a life expectancy 5.2 years higher than men with a tertiary education.

5. *Model specification*

We estimate jointly the Engel curve with housing expenditures, separately for the sets of the families in the poverty-set and people in absolute-poverty: being well nourished and living in a warm house are complements in the capability set of a good life (Sen 1985), but food and housing can be substitutes in the commodity space, where we expect a negative sign for housing costs.

The basic equation we estimate is the following:

$$w_i(food) = \beta_0 + \beta_1 \ln(non\ durable_i) + \beta_2 w_i(house) + u_i$$

w_i is the food share on total consumption. Economic literature on Engel law is vast (Chai and Moneta, 2010): an econometric estimate based on a rather homogeneous sample of two married adults, with

the husband employed and who live in London and the South East, shows that the linear logarithmic expenditure share model provides a robust description of behavior for goods like food (Bank, Blundell and Lewbel, 1997). Our approach is to add the share of housing expenditures to the linear logarithmic Engel equation and check the relationship with the food share for two main partitions: families in the poverty-set and absolute-poverty, and as an implied difference, families at-risk.

The expected value for β_2 is negative, as the previous stylized facts suggest, together with some specific researches. A research for the US finds that "poor families reduced their expenditures on food in response to unusually cold weather, whereas richer families did not" (Bhattacharya et al. 2003). A research in Canada assesses that "Families with housing costs that consumed more than 30% of their income has increased odds of food insecurity. Rent arrears were positively associated with food insecurity". Our results, in table 5, confirm this threshold in Italy: 43% of the people in absolute-poverty have housing expenditures higher than 30% of the total consumption. An analysis of the consumption patterns in Italy, before and at the beginning of the second crisis in Italy, finds an increase of the elasticity of food, from 2002 to 2012, an almost constant elasticity for housing expenditures over the same period, and also "a clear North-South dichotomy emerging for food and housing expenditures" (Bono, Cracolici and Cuffaro, 2016). The expected signs are negative both for β_1 and β_2: food share decrease with an increase of non-durable consumption and housing expenditure.

Endogeneity and heteroskedasticity are the major problems of estimation: we first make OLS estimates and then 2SLS to purge endogeneity. We tackle with heterogeneity relying on the classification by family types and geography: heteroskedasticity can be further improved selecting smaller sample, at regional level, but in some cases the sample size becomes too small and the parameters unstable.

6. *Empirical results*

Our estimation strategy is to partition our large sample according to 10 family types, further disaggregating between North and South, poverty-set and absolute-poverty. The detailed partition (for each equation 20 estimates, for North and South separately) already includes all the relevant control variables: we avoid adding other variables for each equation because we want to make a meaningful comparisons of the coefficients within the same framework, and in some cases the number of observation would become too small. Together with the poverty rates in 2013 and 2007, the results can give a first overview of the main impact inside the two partitions of the poverty-set and the absolute-poverty (table 6 – 7). Data are estimated with the HAC (Newey-West) consistent estimator and weighted with the sub-sample population weights.

The Istat sample for the HBS is large, more than 20 thousands households: however the partition in two subsamples, poverty-set and absolute-poverty, and the further subsamples for 10 family types, estimated separately for the North and the South, in some cases result in few cases with limited number of observations. Families at-risk are included in the poverty-set (see table 5). Estimates look coherent and some results emerge (see tables 6 and 7), which we can briefly summarize:

1. The food consumption elasticity with respect to the non-durable consumption is systematically higher in the South of Italy than in the North, for all the family types, both for the families in the poverty-set and absolute-poverty.

2. The coefficients on house shares are higher in the South of Italy than in North, and almost always statistically significant with a negative sign for all the family types. Moreover the coefficients on the house share increase with age and the size of the family, up to 2 children.

3. The changes of absolute-poverty levels between 2007 and 2013 are much higher for the families with children: level and increases are slightly higher in the South than in the North. Singles and couples without children fared better in the North: in the South the couple without children worsened more.

4. The partition of families in the poverty-set shows a clear deterioration of the younger families with children. Being single, without children, implies less risk of poverty in the North as well in the South: being a couple (65+) did not decrease the level risk of poverty with respect to the single (65+).

We use 2SLS, with a fixed set of instruments for all the family types, to make comparable the two estimates: the instruments used are age, employment status, education level, poverty threshold, the shares of housing, durable and non-durable, transport and residual consumption ("other"). We computed the ν Hausman coefficient on the log of the non-durable consumption, to test for endogeneity of β_1 (Wooldridge, 2009, 513), taking housing cost as exogenous for the reasons explained above (§ 4.4). We fail to reject homoskedasticity for some estimates, even if at low level of probability, for some family types in absolute-poverty. When rejected the estimates of this set are however an improvement, as shown by the F statistics of the Breusch-Pagan test: the F test is lower for the set of people in absolute-poverty. Residual heteroskedasticity signal a structural heterogeneity (see figures 12 and 13): indeed, it is an economic warning for an anti-poverty policy to coordinate national and local levels, taking care of more complex family situations, distant from the "average". Acknowledgment of the intrinsic heterogeneity of family types is naturally connected with the questions raised about well-being and sustainability by the Stiglitz-Sen-Fitoussi Report and its recommendation to analyse what happens at the bottom of the income distribution (Stiglitz, Sen Fitoussi, 2009). The main results of 2SLS are the following (tables 8 and 9):

5. The coefficients do not change significantly, as well as the general pattern between food and housing, family types, North and South. The t-statics decrease, but remain significant, especially for the families with children. If we select the families with 1 and 2 children the food-elasticity for the absolute-poverty can be fixed at -0.16 in the North and -0.30 in the South, while the coefficient for housing costs is -0.16 (1 child) and -0.19 (2 children) in the North, and -0.22 (1 child) and -0.28 (2 children) in the South. The coefficient for the housing is low for the families with 3 children and more, and the single parents in the North: probably reflecting different kind of housing arrangement.

Table 6 - *OLS – poverty-set - food-share=β(0)+β(1)*ln(non durable consumption)+β(2)*(share house)*
t- Student in parenthesis

No.	Family - at-risk-of-absolute-poverty	North South	No.obs.	β(1) Food Elasticity	β(2) House Share	R2 adj.	poverty rate 2013	Δ 2013-2007
1	Single < 35 years	North	34	−0.115 (−3.70)	−0.040 (−0.88)	0.376	17.1	6.5
		South	22	−0.233 (−8.33)	−0.010 (−0.16)	0.863	11.0	1.2
2	Single 35-64 years	North	180	−0.173 (−13.45)	−0.08 (−2.20)	0.653	12.9	-2.0
		South	87	−0.224 (−9.46)	−0.164 (−2.95)	0.640	11.0	1.2
3	Single 65+	North	177	−0.198 (−9.10)	−0.110 (−2.19)	0.660	12.9	-3.8
		South	163	−0.243 (−11.39)	−0.298 (−3.93)	0.646	13.5	0.1
4	Couple without children (<35 year ref. person)	North	37	−0.122 (−8.44)	−0.140 (−2.01)	0.552	27.1	10.9
		South	3	−0.169 (−8.71)	n.c. (-)	0.920	13.3	4.2
5	Couple without children (35-64 years ref person)	North	151	−0.171 (−10.92)	−0.150 (−4.32)	0.559	17.6	3.2
		South	97	−0.225 (−17.54)	−0.162 (−2.41)	0.674	21.8	9.7

6	Couple without children (65+ years ref. person)	North	217	−0.173 *(−11.16)*	−0.177 *(−3.60)*	0.662	17.6	1.3
		South	211	−0.210 *(−10.53)*	−0.182 *(−2.75)*	0.560	21.4	9.4
7	Couple with 1 child	North	422	−0.175 *(−16.11)*	−0.180 *(−4.76)*	0.549	28.4	8.8
		South	358	−0.193 *(−18.59)*	−0.199 *(−6.99)*	0.497	29.4	14.2
8	Couple with 2 children	North	393	−0.169 *(−10.69)*	−0.276 *(−5.55)*	0.545	34.7	12.3
		South	504	−0.191 *(−13.33)*	−0.298 *(−7.52)*	0.512	36.8	17.1
9	Couple with 3+ children	North	127	−0.100 *(−3.71)*	−0.141 *(−2.10)*	0.291	48.8	20.4
		South	185	−0.172 *(−4.48)*	−0.260 *(−3.83)*	0.380	44.9	18.7
10	Single parents	North	197	−0.178 *(−8.25)*	−0.106 *(−1.62)*	0.502	26.7	7.4
		South	203	−0.223 *(−13.67)*	−0.188 *(−4.39)*	0.629	30.3	12.7

Source: our calculations and estimates on Istat HBS - Note: n.c. not computable

Table 7 - *Absolute-poverty -OLS - food-share=β(0)+β(1)*ln(non durable consumption)+β(2)*(share house)*
t- Student in parenthesis

No.	Family - at-risk-of-absolute-poverty	North South	No.obs.	β(1) Food Elasticity	β(2) House Share	R2 adj.	poverty rate 2013	Δ 2013-2007
1	Single < 35 years	North	13	−0.087 (−3.42)	−0.031 (−0.67)	0.559	7.1	1.0
		South	7	−0.247 (−8.06)	−0.151 (−1.22)	0.864	4.4	0.6
2	Single 35-64 years	North	68	−0.174 (−8.73)	−0.037 (−0.99)	0.747	5.2	-0.3
		South	42	−0.169 (−8.57)	−0.068 (−1.39)	0.735	5.5	0.5
3	Single 65+	North	64	−0.153 (−8.82)	−0.111 (−3.07)	0.763	5.3	-0.9
		South	55	−0.179 (−6.03)	−0.126 (−1.26)	0.503	4.5	-0.3
4	Couple without children (<35 year ref. person)	North	14	−0.147 (−4.59)	−0.189 (−2.28)	0.598	11.0	2.3
		South	3	−0.169 (−8.71)	n.c. -	0.920	13.3	10.2
5	Couple without children (35-64 years ref person)	North	54	−0.146 (−6.68)	−0.131 (−2.54)	0.524	6.7	1.9
		South	38	−0.218 (−13.17)	0.036 (0.33)	0.789	8.0	4.9

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6	Couple without children (65+ years ref. person)	North	92	−0.215 (−10.43)	−0.108 (−2.46)	0.813	7.3	1.1
		South	82	−0.237 (−6.10)	−0.191 (−1.92)	0.571	8.2	4.0
7	Couple with 1 child	North	162	−0.171 (−11.46)	−0.164 (−3.34)	0.665	11.2	3.2
		South	149	−0.207 (−8.25)	−0.205 (−3.09)	0.530	12.6	6.8
8	Couple with 2 children	North	168	−0.150 (−6.20)	−0.183 (−3.80)	0.526	14.5	6.8
		South	204 t-S	−0.212 (−8.06)	−0.285 (−5.52)	0.559	14.9	7.8
9	Couple with 3+ children	North	63	−0.134 (−5.53)	−0.049 (−0.74)	0.391	26.7	12.3
		South	87	−0.255 (−4.46)	−0.115 (−1.51)	0.549	21.8	12.3
10	Single parents	North	94	−0.154 (−7.15)	−0.033 (−0.38)	0.479	11.8	3.9
		South	81	−0.278 (−11.58)	−0.103 (−1.23)	0.655	12.4	5.2

Source: our calculations and estimates on Istat HBS - Note: n.c. not computable

Table 8 - *Poverty-set - 2SLS- food-share=β(0)+β(1)*ln(non-durable consumption)+β(2)*(share house)*
t- Student in parenthesis

No.	Family - at-risk-of-absolute-poverty	North South	No. obs.	β(1) Food Elasticity	β(2) House Share	R2 adj.	v	F - BP	Prob.
1	Single < 35 years	North & South	64	−0.190 (−5.17)	−0.074 (−1.53)	0.617	0.022 (0.614)	1.52	0.225
2	Single 35-64 years	North	180	−0.200 (−6.88)	−0.081 (−2.09)	0.637	0.036 (1.681)	10.15	0.0001
		South	87	−0.290 (−9.84)	−0.135 (−2.77)	0.594	0.113 (2.922)	11.50	0.0000
3	Single 65+	North	177	−0.224 (−7.90)	−0.117 (−2.08)	0.649	0.043 (2.015)	13.43	0.0000
		South	163	−0.293 (−10.94)	−0.271 (−3.68)	0.624	0.082 (2.490)	7.45	0.0008
4	Couple without children (<35 year ref. person)	North & South	47	−0.071 (−2.45)	0.04 (−0.74)	0.490	−0.076 (2.748)	3.99	0.0255
5	Couple without children (35-64 years ref person)	North	151	−0.189 (−5.73)	−0.176 (−4.21)	0.511	0.029 (0.930)	4.76	0.0098
		South	97	−0.258 (−12.16)	−0.220 (−3.89)	0.738	0.077 (2.781)	5.37	0.0062

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6	Couple without children (65+ years ref. person)	North	217	−0.174 (−5.99)	−0.177 (−3.69)	0.662	0.001 (0.061)	21.54	0.0000
		South	211	−0.240 (−7.20)	−0.172 (−2.50)	0.550	0.037 (0.861)	11.63	0.0000
7	Couple with 1 child	North	422	−0.215 (−9.86)	−0.207 (−4.66)	0.520	0.051 (2.426)	60.90	0.0000
		South	358	−0.275 (−10.06)	−0.274 (−4.88)	0.410	0.110 (3.692)	33.68	0.0000
8	Couple with 2 children	North	393	−0.204 (−7.18)	−0.303 (−5.46)	0.545	0.052 (1.910)	38.51	0.0000
		South	504	−0.266 (−8.83)	−0.304 (−6.60)	0.448	0.015 (−1.652)	12.49	0.0000
9	Couple with 3+ children	North	127	−0.033 (−0.10)	−0.099 (−1.57)	0.291	−0.105 (−1.652)	26.88	0.0000
		South	185	−0.161 (−2.47)	−0.257 (−3.69)	0.380	−0.0137 (−0.234)	10.41	0.0001
10	Single parents	North	197	−0.179 (−3.89)	−0.187 (−1.34)	0.502	0.002 (0.003)	11.42	0.0000
		South	203	−0.228 (−10.98)	−0.187 (−4.31)	0.629	0.007 (0.223)	11.19	0.0000

Source: calculation on Istat HBS
Note: for the family types 1 and 4 it was not possible to distinguish North and South
v is the residuals' coefficient of the Hausman test. F is the statistcs of Breusch-Pagan test and P the probability of the H null.

Table 9 - *Absolute-poverty - 2SLS - food-share=β(0)+β(1)*ln(non durable consumption)+β(2)*(share house)*
t- Student in parenthesis

No.	Family Type - absolute-poverty	North South	No. obs.	β(1) Food Elasticity	β(2) House Share	R2 adj.	ν	F - BP	Prob.
1	Single < 35 years	North & South	25	−0.226 (−4.97)	−0.021 (−0.026)	0.655	0.064 (1.220)	1.71	0.204
2	Single 35-64 years	North	68	−0.199 (−7.65)	−0.027 (−0.077)	0.731	0.043 (1.755)	2.86	0.0645
		South	42	−0.290 (−9.84)	−0.135 (−2.77)	0.594	0.113 (2.922)	2.95	0.0637
3	Single 65+	North	64	−0.169 (−6.44)	−0.129 (−2.08)	0.755	0.03 (1.626)	3.31	0.0430
		South	55	−0.193 (−5.03)	−0.131 (−1.17)	0.499	0.036 (0.742)	7.39	0.0015
4	Couple without children (<35 year ref. person)	North & South	47	−0.139 (−4.99)	−0.114 (−2.16)	0.730	0.002 (0.057)	5.94	0.0104
5	Couple without children (35-64 years ref person)	North	54	−0.134 (−4.77)	−0.097 (−1.76)	0.487	−0.011 (−0.282)	5.11	0.0037
		South	38	−0.240 (−12.16)	−0.069 (−0.73)	0.846	0.029 (0.637)	1.38	0.2628

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6	Couple without children (65+ years ref. person)	North	92	−0.225 (−5.84)	−0.106 (−2.36)	0.812	0.015 (0.425)	5.98	0.0037
		South	82	−0.246 (−2.71)	−0.191 (−1.86)	0.571	0.011 (0.861)	6.66	0.0021
7	Couple with 1 child	North	162	−0.166 (−7.48)	−0.160 (−3.29)	0.665	0.144 (3.159)	23.94	0.0000
		South	149	−0.316 (−6.40)	−0.225 (−2.99)	0.396	0.110 (3.692)	23.56	0.0000
8	Couple with 2 children	North	168	−0.159 (−4.56)	−0.192 (−3.46)	0.524	0.017 (0.603)	19.61	0.0000
		South	204	−0.300 (−7.49)	−0.284 (−6.60)	0.448	0.116 (3.218)	7.22	0.0009
9	Couple with 3+ children	North	63	−0.109 (−2.94)	−0.046 (−0.75)	0.291	−0.061 (−1.04)	4.54	0.0145
		South	87	−0.345 (−3.81)	−0.046 (−0.405)	0.492	0.153 (1.742)	6.22	0.0030
10	Single parents	North	94	−0.174 (−3.98)	−0.044 (−0.536)	0.471	0.002 (0.003)	7.60	0.0009
		South	81	−0.278 (−8.82)	−0.103 (−0.941)	0.655	0.002 (0.000)	11.19	0.0000

Source: our calculations on Istat HBS
Note: for the family types 1 and 4 it was not possible to distinguish North and South

7. *Economic policy implications*

It is an unpleasant reality that negative externalities are widespread and potential Pareto-improvements too often do not become Pareto-efficient: this happens because those who benefit from true gains of technical and social innovations, like free-trade, do not compensate the true loss of those who are harmed. If technical and social innovations are "to be beneficial, or even acceptable, have to be

accompanied by other measures direct toward alleviating poverty and any other excessively harsh effects from increased competition" (Campiglio and Hammond, 1997; 230). The more so, if the consequence is to push them in absolute-poverty: it can be theoretically proved that starvation is "an entirely natural phenomenon of a neoclassical economy with surplus of labour" (Cole and Hammond, 1995) and, indeed, empirical evidences show that this insight can be generalized to malnutrition and premature death.

The relationship between food, housing and poverty is increasingly recognized. Eurostat data show that worse housing conditions are associated with relative poverty: Eu-Silc data on economic strain (extracted 31.1.2017) show that in Italy 35.9% of the population, below 60% of the median equivalised income in 2015, could not "keep home adequately warm", while the same was true only for the 12.3% of the population above 60%. In both cases, below and above 60%, the percentage of population was also cyclical, peaking 44% in 2012 for the population below 60% and 15.8% for the population above 60%.
Social protection benefits for housing in major European countries (extracted 07.02.17) show, according to the Eurostat statistics for 2014, marked differences: as a share of GDP, the UK is the country which spends more (1.4%), followed by France (0.8%) and Germany (0.6%), while there is no social protection expenditure for housing in Italy. At the same time the GDP share of social protection benefits for family and children is highest in Germany and Sweden (3.1%), followed by Austria and the UK (2.8%). European countries with total benefits in-kind above 10% of the GDP are Sweden, Denmark, Finland, France, Germany, UK and Netherlands.

The freedom from want of a healthy nutrition and a warm shelter are at the centre of the capability space, bringing under the spotlight the fundamental role of the women in fending off the hardship of poverty and generate positive externalities. The women take care of the children needs, especially in the early years, and often also of

their older parents, securing a comfortable house and food: sharing monetary resources with the man is implicit, when he is the only earner. If also the woman works in the market, to make end meet and to pursue her capacity, still she maintains her responsibility at home, even if more shared. Women working at home are therefore at the centre of widespread positive externalities for the entire society. In contemporary economies the average wage level is usually too low to be compatible with the "male breadwinner" model: two earners are needed, for an average family, to make ends meet, in particular paying for the rent or the mortgage.

"Family policy is often wage policy in another guise" (Pedersen, 1993): for the families at-risk and even more for the families in absolute-poverty, fixed costs are such a relevant share, at a low consumption (or income) level, to constrain their standard of living. What is more, average values can be a misguided signal of the poverty status: the heterogeneity of their monetary consumption and share of fixed costs (food and housing) is wide, and therefore an economic policy based on average values can easily miss the target, even if carefully conceived. A centralized policy against poverty should be therefore complemented with a decentralized adjustment at local level. Positive externalities of women work, in Italy and other European countries, have been outpaced by the increasing cost of land, during the upsurge of the housing bubble, to the benefit of residential builders and land's owner rentiers, usually pushing higher house price in the centre of the major cities, then rippling to reach for the outskirts. Balancing the negative housing externalities on poverty, empowering women and children for their positive externalities looks, in principle, an efficient economic policy, becoming a part of a basic income for the poor. Revenues from capital gains on land values and houses could possibly be part of a public transfer, which acknowledges empowerment of women and their children and, at the same time, could foster economic growth (Bonatti, 2016, 2017). Migration toward urban area and cities, especially of young people searching for job opportunities, is a central feature of economic development: large cities are the source of productivity advantage (Combes, Duranton and Gobillon, 2012),

but also of increasing land prices and housing costs to the disadvantage of the less skilled.

In Europe, Minimum Income Schemes have been increasingly discussed as possible instruments against poverty, defined as "income support schemes which provide a safety net for those who cannot work or access a decent work and are not eligible for social insurance payments or those whose entitlements to these have expired. They are last resort schemes" (European Commission, 2015). The economic debate has been recently focused on the notion of basic income: a simulation using EUROMOD dataset based on the Survey of Income and Wealth (SHIW) in 1998, concludes that the best policy would be an unconditional basic income, amounting to 70% of the relative poverty line (half of the median) (Colombino, 2014).

Van Parijs proposal on the basic income is more specific, allowing a positive debate on the requirements he set out. He proposes a scheme bases on four pillars: a) a basic income anchored to ¼ of the GDP per capita (700 euro monthly in Belgium), b) paid in cash rather than in kind (to avoid paternalism, the lower amount for children should be paid to an adult), c) a strictly individual entitlement, universal and with no obligation to work, d) without means-test (Van Parijs 1995, Van Parijs and Vanderborght, 2017). Individual universality, without conditionality, has been objected because overlooks the social reasons of the community and, in this sense, offers "a solution that is too simple, given the nature of the complexities involved in the problem" (Farrelly, 1999). Cash may not be enough, because there are increasing scales and fixed costs: even 700 euro, would fall short of the basic consumption for rent, utilities and food (www.expatisan.com/cost-of-living/brussels). Moreover, solely a money transfer would expose the worst-off to the price vagaries of a market economy, and the unavoidable and uncertain lag by the political institutions. The intuition of basic income seems clear, but in fact the range of possible proposals is much wider (Granaglia and Bolzoni, 2016).

Our analysis suggest that a policy against the absolute-poverty, fending off the risk of a poverty-trap, should be designed multi-layered, and the basic income should be rather be intended as the aggregate volume of resources necessary to effectively escape persistent poverty, both in cash and in kind, with special regard to health care and education for the children and the disabled, balancing negative and positive externalities in time and space. Heterogeneity of families and persons should be taken care as a structural feature, to be addressed with a careful coordination of economic policies at local and national level.

8. *Conclusions*

We analyse poverty in Italy because the European crisis (2010-2015) has divided Europe in two: half of the population improved its standard of living and half worsened (Campiglio 2017). Austerities policies halted the economic convergence. The question of "who" is paying for the austerity policy is of paramount importance: we show that the heaviest burden has been paid by the "poor", and more specifically by the "poor" families with children. We show that the annual changes of a food-based poverty measures are distinctly countercyclical, as well as the level of the Sen index, which increased sharply from 2007 to 2013. In Italy, as everywhere, the boom and bust of the housing bubble has been a curse on the poor, both in boom and bust.

We show that a major cause of absolute-poverty comes in the form of a negative market externality of the housing market: poor families pay "too much", out-of-pocket, for housing costs, if compared with the more well-off families, forcing a constraint on the food consumption for the worst-off, given the same fixed share of fixed costs for both, but quite different consumption levels. The average share of fixed costs, in 2013, was 49%, for all the three subsets of absolute-poverty, at-risk-of-absolute-poverty and more well-off families: on average, well-off families with higher consumption levels consume a higher share of food, at home and outside, than the families in absolute-poverty. The value of the "satiation point" for the well-off is higher than the families in the poverty-set: more detailed data on price, quantity and quality of food consumption are needed. The kernel density for the share of fixed-costs is normally distributed for the entire sample and slightly normal platykurtic for the families in absolute-poverty. Families in absolute-poverty, paying more than 30% of their consumption budget for housing expenses, end up paying, on average, almost 70% of their total consumption on fixed-costs (food and housing).

We run parametric estimates, OLS and 2SLS with the same set of

instruments, for 10 family types, partitioning a poverty-set which include families in absolute-poverty and at-risk, distinguishing between North and South of Italy: the results lend support to the substitution effect between food and housing, and confirm a high degree of heterogeneity, even within the same family type and geographical area. Our estimates show that children and their families in absolute-poverty are the most hit group by the economic crisis: young families lost grounds. For a family of 2 adults and 1 or 2 children in absolute-poverty the estimate of food elasticity can be fixed to -0.16 in the North and -0.30 in the South, while the housing coefficients differ: for 1 child it is -0.16 in the North and -0.22 in the South, while for 2 children it is -0.19 in the North and -0.28 in the South.

Housing expenditures are a node of widespread externalities, like good nutrition, health and life expectancy: houses of the more well-off families are distinctly warmer than the worst-off families, absolute-poverty rates are higher for the families living in rented houses and when the reference person has a lower level of education: health inequality for the less educated adds to the income inequality.
Balancing the negative housing externalities on poverty, empowering women and children for their positive externalities look an efficient economic policy, possibly part of a basic income, or a public transfer from rent to wages.

The goal of full employment is a necessary but not sufficient condition to minimise absolute-poverty and the risk of a poverty-trap: free access to in-kind health care and education for the children and the disabled should be a basic requirement, also for a monetary basic income, shielding the worst-off and the children from the vagaries of market prices. Heterogeneity is a structural characteristic, which can be properly addressed only if national policies are adjusted at local level. Freedom of choice, hallmark of market economies depends from the freedom from basic wants, namely the self-respect of a good job, a warm house and healthy food, for the body and the mind.

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