

Household consumption expenditure and material deprivation in Italy during last economic crises

Spesa delle famiglie e deprivazione materiale in Italia durante le ultime crisi economiche

Ilaria Arigoni and Isabella Siciliani

Abstract

The severe economic crises affecting Italy during the last decades have had serious effects on the living conditions of residing households. Household disposable income decline was associated with a general decrease of household consumption expenditure, mainly in the period 2011-2013, and a rearrangement of its structure, with a slight increase in the expenditure share on food and non-alcoholic beverages (*foodshare*) whose increase is a well-known symptom of stronger budget constraints. However, economic hardships affected households differently, producing inequality increase and an enlargement of the share of population suffering from material deprivation.

This paper attempts to shed light on extent and the characteristics of the impact on household living conditions of the economic crises in Italy, and tries to describe the most affected subgroups of population. Results are based on the 2007-2013 data of the two main socioeconomic surveys conducted by Istat: the Household Budget Survey (HBS) and the Income and Living conditions Survey (IT-SILC).

The general framework is deepened by modelling separately the share of expenditure on food and non-alcoholic beverages and the material deprivation on a set of pooled data (in order to disentangle the time effect) and by single year.

1 Introduction

Italian economy was first affected by economic crisis in 2008, year of the initial decline of the GDP (-1.1% at constant prices), and then in 2009, when GDP suffered a heavy fall (-5.5%), followed later by other significant drops in 2012 and 2013 (-2.8% and -1.7%, respectively).

This long period of economic crisis, characterizing the last decade, has had serious effects on household living conditions. Average and median household disposable income, at constant prices, has declined, while the general reduction of available economic resources has implied a similar decay of household savings and household consumption expenditure. The latter has been rearranged in its structure, with the share of expenditure on food and non-alcoholic beverages (*foodshare*) gaining a slight increase during the crisis period, perhaps as a symptom of stronger budget constraints.

The main objective of this paper is to shed light on the extent and the characteristics of the impact of the most important economic crises of this century on the living conditions of households residing in Italy, trying to find out the features of the most affected subgroups of population. Analyses embrace the period from 2007, formally considered the pre-crisis year, until 2013, the last year of the GDP decrease. Results are based on data from the two main socioeconomic surveys conducted by Istat: the Household Budget Survey (HBS) and the Income and Living conditions Survey (IT-SILC).

¹ Ilaria Arigoni, Istat; email: ilaria.arigoni@istat.it
Isabella Siciliani, Istat; email: isabella.siciliani@istat.it

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After a general portrait of the main changes occurred in household incomes and household consumption expenditures, the paper first focuses on trends of foodshare and severe material deprivation and then on household subgroups most affected by economic crises, taking into account both the foodshare and the breadth of severe deprivation. It is worthwhile highlighting that the severe material deprivation concerns households suffering stronger economic hardships.

The identification of the main characteristics of the most vulnerable subgroups of population is carried out through linear regression models. First, by modelling the foodshare on HBS pooled data 2007-2013, a clearer picture of the factors influencing its variation (predictors) is obtained; more, controlling for household socioeconomic characteristics, the time effect during the crisis period can be isolated. Then, running separate models for each year of the above mentioned period, changes in the relationship between the foodshare and its main predictors may be investigated. In the same way, pooling the IT-SILC data 2007-2013, the household deprivation share is modelled on a set of variables (including time effects) in order to describe its main predictors and figure out, *ceteris paribus*, the impact of the time dimension. Afterwards, separate models are performed for each year, to point out possible changes in the relationship between the breadth of severe deprivation and its predictors.

2 Data and Methodology

As already mentioned above, this paper is based on data from the Household Budget Survey (HBS) and from the Income and Living conditions Survey (IT-SILC, included in the system of European Statistics on Income and Living Conditions - EU-SILC), both carried out by Istat.

The Italian HBS focuses on consumption expenditure behaviours of households residing in Italy. It analyses the evolution of level and composition of household consumption expenditure according to their main social, economic and territorial characteristics. The main focus of the HBS is therefore represented by all expenditures incurred by resident households to purchase goods and services exclusively devoted to household consumption (self-consumptions, imputed rentals and presents are included); every other expenditure for a different purpose is excluded from the data collection (e. g., payments of fees and business expenditures). The Italian HBS represents the informative base for the official estimates of relative and absolute poverty in Italy.

The EU-SILC, set up with the Regulation of the European Parliament no. 1177/2003 and first launched in 2004, is the reference source for comparative statistics on income distribution and social inclusion in the European Union. It provides both cross-sectional and longitudinal annual data on income, poverty, social exclusion and other living conditions.

As far the key indicators analysed in this paper, the foodshare is the ratio of household expenditure on food and non-alcoholic beverages to total household consumption expenditure; according to Engel's Law, "this share in the budget declines as income or total outlay increases". The assertion, made by Engel, is that "foodshare is a good indicator of welfare" (Engel, 1895). More recently, Deaton wrote that "since food is seen as the first necessity, the share of food in total expenditure can be regarded as an (inverse) indicator of welfare. It is also a very convenient indicator, since its definition as a dimensionless ratio renders it comparable over time periods and between geographical locations, at least if the relative price of food does not vary too much. However, the real interest in the food share is that it may be capable of acting as a better indicator of welfare than measures based on income or expenditure alone" (Deaton, 1981). This indicator has been largely used in studies on developing economies; however, considering the severity of the economic crises of the last decade and their tangible effects on the living conditions of households residing in Italy (at macro indicator level), in this paper it is assumed that in the period 2007-2013 the foodshare behaved as a welfare indicator although in the context of an advanced economy such as the Italian one. The foodshare indicator is expressed in percentage values.

The rate of population at risk of poverty or social exclusion (AROPE) is among the main indicators used to measure the status of economic hardship of people living in private households at EU level², based on EU-SILC data. It includes the share of population at risk of poverty (with an equivalised income below 60% of the median equivalised income for the population as a whole) or severely material deprived (suffering from at least four out of nine items of deprivation) or living in households with low work intensity. After first economic crisis, in Italy AROPE increased primarily for the worsening of severe deprivation, one of the two indicators considered in this work. The choice of such an indicator depends on its nature of non-relative indicator, that aims at measuring economic and financial difficulties in absolute terms, independently by changes affecting the whole distribution. That is why it is particularly appropriated for across

² In fact, for this indicator a precise target has also been chosen within the 2020 Europe strategy (established in 2010) to fight against poverty and social exclusion: that is to lift from this condition at least 20 million people, 2,2 million of which in Italy (see, European Commission 2010 and European Commission 2011).

time analyses. However, the severe deprivation indicator is a synthetic measure covering nine different symptoms of deprivation; once a person overcomes the cut-off threshold of four items, no further distinction is possible. Actually, a severely deprived person could suffer potentially from 4 to 9 symptoms of deprivation; therefore, in order to capture the breadth of severe material deprivation, the Alkire-Foster approach (Alkire and Foster, 2011) has been applied, based on the dual cut-off identification method. Given n individuals and d dimensions, for each dimension j a cut-off z_j is identified to establish if a person i is deprived in j -dimension, and then a cut-off k is used to determine who is multidimensional poor (in the specific case, severely deprived over nine dimensions, using $k=4$). Once identified the severely deprived, a censored deprivation matrix $g_0(k)$ of n rows and d columns is constructed with the value of deprivation on each dimension only for the severely deprived, while for non-severely deprived individuals all the d values are set to zeros. The measure M_o (adjusted headcount ratio) is the mean of the elements of the censored deprivation matrix. It can be interpreted as the total deprivations experienced by the severely deprived, divided by the maximum number of deprivations that could possibly be experienced by all people, that is nd :

$$M_o = \frac{\sum_{i=1}^n \sum_{j=1}^d g_0(k)_{ij}}{nd}$$

One of the properties of the above indicator is the decomposability across population groups and across dimensions, not feasible with the standard severe deprivation indicator. This feature allows to measure the contributions of the several symptoms of deprivation to the overall indicator across time.

In order to outline which subgroups of population suffered most from economic crises, linear regression models have been performed, first on pooled data 2007-2013 and then for each year in the same period; dependent variables are foodshare and the breadth of deprivation, considered as proxy measures of economic hardships. Models, that have run separately on HBS and IT-SILC data, have been based as much as possible on the same set of covariates³: place of residence (geographical area and type of municipality); household size and type; number of in-work members; age, level of education attained and activity status of the Reference Person (HBS) or Bread Winner (IT-SILC); house tenure status; quintiles of equivalent household total expenditure (HBS) or of income (IT-SILC). Models based on pooled data have shed light on time effects, while models by single year have enlightened the existence of changes in parameter estimates across time and their strength. Households are units of analysis, being all the variables considered common to all household members.

As far the model based on IT-SILC data, a couple of clarifications are needed. The breadth of deprivation is measured as the percentage share of deprivation, ranging from a minimum of zero, if a household is not deprived at all, to a maximum of 100, if a household is affected by all symptoms of deprivation. In analytical terms, the dependent variable, the household deprivation share (HDS), is the sum of the elements of the censored deprivation matrix divided by the maximum number of dimensions (multiplied by 100) for each row of the matrix⁴:

$$y_i = \frac{\sum_{j=1}^d g_0(k)_j}{d} * 100$$

As far the pooled data model, due to the longitudinal structure of the EUSILC survey, in order to deal with repeated measures on the same set of households and the presence of a non-negligible level of intra-class correlation (ICC=0.44) within the same households across time, a linear mixed model⁵ with random effect on the intercept has been applied:

$$\left. \begin{aligned} Y_{it} &= \beta_{0i} + \beta_1 X_{1it} + \dots + \beta_H X_{Hit} + \lambda_1 \delta_{it} + \dots + \lambda_{T-1} \delta_{iT-1} + \varepsilon_{it} \\ \beta_{0i} &= \gamma_{00} + u_{0i} \\ \beta_h &= \gamma_{0h} \quad \forall h \end{aligned} \right\} \Rightarrow$$

$$Y_{it} = \gamma_{00} + \gamma_{01} X_{1it} + \dots + \gamma_{0H} X_{Hit} + \lambda_1 \delta_{it} + \dots + \lambda_{T-1} \delta_{iT-1} + u_{0i} + \varepsilon_{it}$$

with $i = 1, 2, \dots, n$ households, $t = 1, 2, \dots, T$ time – units, ε_{it} = error term for household i and time t , u_{0i} = random effect for household i .

3 General Framework

In the observed period (2007-2013), two economic crises were registered: the first significant drop in GDP was recorded in 2009 (-5.5% compared to 2008), the second was shown in 2012-2013 (respectively, -2.8% and -1.7% compared to the previous year value).

Household income (at constant prices) in 2009 had, on average, an increase and a trend inversion compared to the previous two years; its first decrease started in fact in 2010, with one-year lag respect to the GDP. That reduction went on until 2013, showing an impoverishment of the average household economic conditions: the overall decrease, since

³ The choice of the covariates has been based on information common to the two surveys.

⁴ The mean value of this dependent variable across all population units provides the adjusted headcount ratio M_o .

⁵ The MIXED Procedure included in the SAS package has been used.

2007, was -12.3% (Figure 1). This trend is not reasonably due to a decrease in household size, since for the same period the equivalised income showed the same trend, although with an overall reduction less intense (-10.8%).

During the whole period 2007-2013, household consumption expenditure (at constant prices) had a continuous decline, even sharper than the one observed for household income in the same time interval (for consumptions, the overall decrease since 2007 was -16.7%) and double than the decrease of GDP after 2011 (-8.6% versus -4.4%). Still compared to the GDP, between 2009 and 2011 household consumption expenditure did not confirm the same slight recovery: its lagging behind the economic growth was probably related to the fact that, in light of international uncertainty, households were cautious in their consumption expenditures.

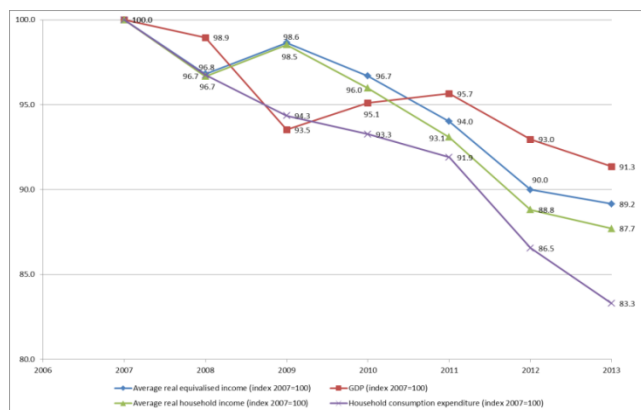


Figure 1 - GDP, household and equivalised income at constant prices, household consumption expenditure at constant prices

After first economic crisis in 2008, in Italy foodshare started increasing slightly since 2010 onwards, to reach the value of 22.4% in 2013 (Figure 2). This trend was quite differentiated within the national borders: in the North there was no dynamic at all; in the Centre, it started later but the foodshare increased from 20.4% in 2011 to 21.5% in 2013, registering the highest percentage increase from 2011 to 2013, considering the three geographical areas; in the South, where the situation is structurally worse than in the rest of the country, the foodshare started increasing since 2010 but more softly than in the Centre.

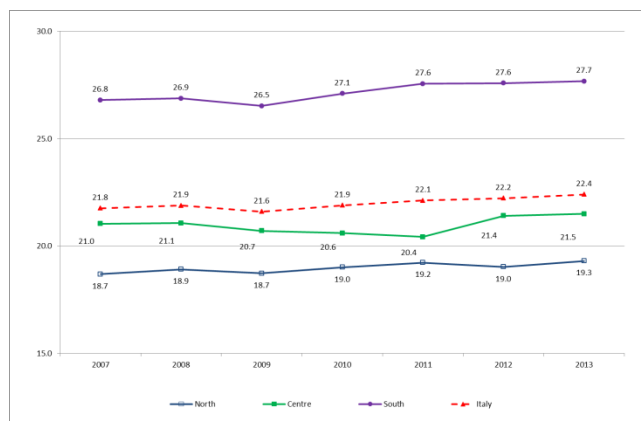


Figure 2 – Share of household expenditure on food and non-alcoholic beverages at national level and by geographical area (percentage values)

Focusing on the economic most disadvantaged groups, the share of population AROPE, equal to 26% in 2007, after a slight improve in the following three years, reached in 2011 the value of 28.1% and a peak of 29.9% in 2012 (Figure). Investigating the different components of the AROPE, it is clear that this big raise is due to the growth of severely deprived: the population share suffering from severe deprivation passed from 7.4% in 2010 to 11.1% in 2011, followed by a successive increase to 14.4% in 2012. Until 2010 there was not a significant increase in material deprivation, thanks to the strengthening of workers' income support measures, such as unemployment benefits and salary integration allowances, and thanks to household strategies, set up to tackle the progressive erosion of their purchasing power (drawing assets, saving less or borrowing). With the continuation of the crisis, however, in 2011 there was a strong deterioration of the situation, with an increase in the material deprivation rate, and in 2012 household economic difficulties further widened (Istat, 2014). After this year the severely deprived decreased, but never accounting less than 12%.

Even if in 2011-2012 the severe deprivation widened, it seemed to have become less hard in terms of symptoms of deprivation: in fact, the average number of deprivation items, equal to 4.57 in 2010, dropped to 4.42 in 2011 and 4.36 in

2012 (Figure), and the adjusted headcount ratio (following the Alkire-Foster methodology⁶), that takes into account not only the deprived but also the width of deprivation among the deprived, recorded a smoother increasing trend than the severe deprivation headcount ratio. The latter approach allows also measuring the contribution of the different dimensions to the overall index of severe deprivation, in order to know which one of them influences more the synthetic index, and whether its relevance has changed across time. Looking at the different dimensions (or items) of deprivation, the main contributions before and after 2011 were given by the unaffordability of an annual week holiday away from home (22%) and by the inability to face unexpected financial expenses corresponding to the monthly national at-risk-of-poverty threshold (22%). A little less than a fifth was the contribution of the inability to keep home adequately warm, while the relevance of the unaffordability of an appropriate protein meal every second day increased from 14% in 2010 to 17% in 2011 and 19% in 2012; on the contrary, being in arrears (with utility bills, rent, mortgage or other debts) weakened its significance from 16% in 2010 to 14% in 2011, and even 11% in 2012⁷.

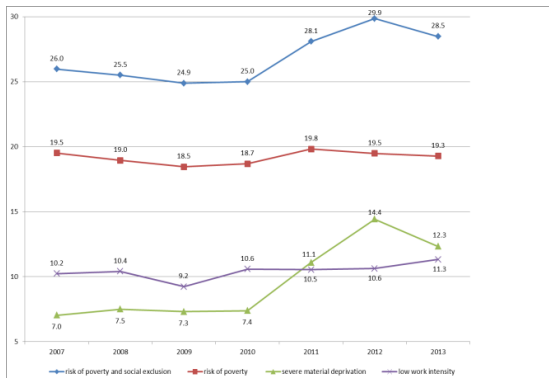


Figure 3 - Population at risk of poverty and social exclusion, at risk of poverty, severely deprived and in low work intensity households (values per 100 individuals)

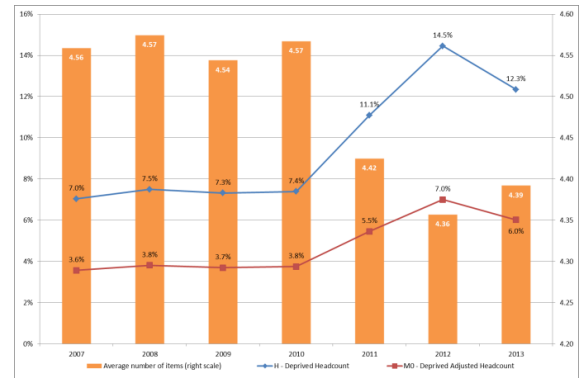


Figure 4 - Population severely deprived, adjusted headcount ratio of severely deprived (values per 100 individuals), average number of items of deprivation

4 Results

As reported above, analyses presented in this paper rely on a twofold strategies to measure household economic hardships during the last economic crises. On one side, it has been hypothesized an expansion of the expenditure share on food and non-alcoholic beverages (FOSH) for stronger budget constraints, on the other a strengthening of material deprivation has been theorized, measured in terms of household deprivation share (HDS). FOSH and HDS dependent variables were regressed separately on a set of common dependent variables describing household place of residence and socioeconomic conditions⁸.

⁶ For a wider application of the Alkire-Foster methodology to the analysis of multidimensional poverty in the EU Countries. see Alkire and Apablaza, 2017.

⁷ Taking into account the headcount ratios, from 2010 until 2012 the items of deprivation showing the biggest increases were: unaffordability of an annual week holiday away from home (40.5% in 2010, +5.94 p. p. in 2011 and +4.41 p.p. in 2012); unaffordability of an appropriate protein meal (7% in 2010, +5.72 p.p. in 2011 and +4.38 in 2012); inability to keep home adequately warm (11.6% in 2010, +6.22 p.p. in 2011 and +3.45 p.p. in 2012); inability to face unexpected financial expenses (33.8% in 2010, +4.43 p.p. in 2011 and +3.91 p.p. in 2012). The increase of the severe deprivation started in 2013 (also due to a more favourable inflation dynamics compared to 2012) concerned mostly the affordability of a protein meal every second day (-3.15 p.p.), the ability to keep home adequately warm (-2.45 p.p.) and the ability to face unexpected financial expenses (-1.91 p.p.) (Istat, 2014).

⁸ Namely, covariates are: the natural logarithm of household size (LNHSIZE); the age of the Reference Person (AGERP); the education level attained by the Reference Person, distinguished in low (EDURPLOW), medium (EDURPMEDIUM) and high (EDURPHIGH); the activity status of the Reference Person, grouped in self-employed (ACTRPSSELF), employee (ACTRPDEP), retired (ACTRPRET) and other than the mentioned conditions (ACTRPOTHER); the number of household members working (NHHWORKER); the household type, classified in single person less than 65 years (HHTYPE_SPLESS65), single person 65 years and over (HHTYPE_SPLEAST65), couple without children with Reference Person less than 65 years (HHTYPE_CNOCHILDLESS65), couple without children with Reference Person 65 years and over (HHTYPE_CNOCHILDLEAST65), couple with one child (HHTYPE_C1CHILD), couple with two children (HHTYPE_C2CHILDREN), couple with three or more children (HHTYPE_C3CHILDREN), single parent (HHTYPE_SPARENT), other household typologies than the mentioned (HHTYPE_OTHER); the accommodation tenure status, if rented (HOUSE_RENTED) or owned (HOUSE_OWNED); the equivalent total expenditure/income quintile, from QUINTILE1 (the lowest) to QUINTILE5 (the highest). More, the place of household residence has been introduced in the models, taking into account: the geographical area (North, Centre, South) and the size of municipality (Metropolitan area - Centre (BIGMC), Metropolitan area suburbs and municipalities with 50,001 inhabitants and over (MEDIUMM), other municipalities until 50,000 inhabitants (SMALLM)).

Please note that: as IT-SILC reference person, the main income recipient or Bread Winner (BW) has been used; in order to allow for the remaining curvature in the relationship between the dependent variables and AGERP, the square of AGERP has been also introduced (AGERPSQUARED).

By modelling FOSH and HDS on pooled data 2007-2013, controlling for household socioeconomic characteristics, parameter estimates show a time effect during the crisis period on both dependent variables.

Table 1 - Estimates of the OLS regression model coefficients of household foodshare.

Variable	Pooled data	Y2007	Y2008	Y2009	Y2010	Y2011	Y2012	Y2013
Intercept	5.876 **	7.276 **	6.723 **	4.000 **	6.731 **	5.098 **	5.926 **	7.538 **
Y2007	0.000	-	-	-	-	-	-	-
Y2008	0.192 *	-	-	-	-	-	-	-
Y2009	-0.081	-	-	-	-	-	-	-
Y2010	0.201 *	-	-	-	-	-	-	-
Y2011	0.428 **	-	-	-	-	-	-	-
Y2012	0.496 **	-	-	-	-	-	-	-
Y2013	0.728 **	-	-	-	-	-	-	-
North	-1.545 **	-1.816 **	-1.669 **	-1.650 **	-1.292 **	-0.862 **	-1.846 **	-1.631 **
South	3.826 **	3.474 **	3.587 **	3.384 **	4.039 **	4.607 **	3.834 **	3.866 **
Centre	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
bigMC	0.480 **	-0.213	0.583 **	-0.119	0.095	0.706 **	1.028 **	1.316 **
smallM	0.619 **	0.077	0.836 **	0.422 **	0.374 **	0.959 **	0.869 **	0.788 **
mediumM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
lnhsize	1.262 **	1.615 **	1.100 *	2.244 **	1.062 *	1.205 *	1.156 *	0.458
ageRP	0.168 **	0.115 **	0.175 **	0.196 **	0.183 **	0.196 **	0.155 **	0.135 **
ageRPsquared	-0.001 **	-0.001 *	-0.001 **	-0.001 **	-0.001 **	-0.002 **	-0.001 **	-0.001 **
eduRPlow	4.738 **	4.696 **	4.757 **	5.181 **	4.512 **	5.299 **	4.053 **	4.553 **
eduRPmedium	2.524 **	2.566 **	2.396 **	3.196 **	2.031 **	2.649 **	2.142 **	2.650 **
eduRPhigh	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
actRPdep	0.524 **	0.425 *	0.316	0.185	0.699 **	0.506 *	0.919 **	0.758 **
actRPret	0.406 **	0.434	0.004	0.172	0.537	0.358	0.606 *	0.805 **
actRPOther	0.471 **	0.038	0.281	0.621 *	0.760 *	0.001	0.832 **	0.926 **
actRPself	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
nhhworker	-1.005 **	-1.113 **	-1.157 **	-0.843 **	-1.249 **	-1.104 **	-0.732 **	-0.855 **
hhstype_spless65	1.230 **	1.206	0.231	2.098 **	0.816	1.282	2.450 **	0.586
hhstype_spleast65	1.917 **	1.494 *	0.926	3.056 **	1.072	2.137 **	2.871 **	1.947 *
hhstype_cnochildless65	0.725 **	0.985 *	0.040	1.188 **	0.352	0.722	1.241 **	0.681
hhstype_cnochildleast65	1.488 **	1.161 **	0.936 *	2.366 **	0.944 *	1.367 **	2.201 **	1.517 **
hhstype_c1child	0.371 **	0.421	0.344	0.669 **	-0.092	0.583 *	0.790 **	-0.204
hhstype_c3children	0.427 **	0.365	0.263	0.434	0.139	0.203	1.239 **	0.469
hhstype_sparent	0.331 *	0.437	-0.410	0.197	0.327	0.186	1.297 **	0.328
hhstype_other	0.879 **	0.555	0.909 **	0.695 *	0.928 **	1.051 **	1.385 **	0.701 *
hhstype_c2children	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
house_rented	3.209 **	3.266 **	3.645 **	3.227 **	3.161 **	3.504 **	2.963 **	2.655 **
house_owned	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
quintile1	8.930 **	9.251 **	8.744 **	8.553 **	8.539 **	8.839 **	9.036 **	9.692 **
quintile2	6.885 **	7.023 **	6.649 **	6.718 **	6.688 **	6.669 **	7.200 **	7.391 **
quintile3	5.310 **	5.067 **	5.037 **	4.971 **	5.385 **	5.163 **	5.409 **	6.353 **
quintile4	3.506 **	3.454 **	3.385 **	3.464 **	3.707 **	3.474 **	3.428 **	3.717 **
quintile5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	159845	24400	23423	23005	22246	23158	22933	20680
adj-R-squared	0.2814	0.291	0.2836	0.2717	0.2748	0.2916	0.2699	0.2949
* significant at p=0.05								
** significant at p=0.01								

For FOSH variable (Table 1, pooled data), the increase of time effect starts in 2010 (when the estimate is 0.201 higher than in the reference year 2007) to reach the value of 0.728 in 2013.

For households belonging to lower equivalent total expenditure quintiles, residing in the South, with low educated Reference Person and living in a rented accommodation, FOSH variable raises the most. Across time, the relative wider foodshare of households residing in the South rises slightly, especially in 2010 and 2011 (respectively 4.039 and 4.607 compared to 3.474 of year 2007). Since 2010, just after the first economic crisis, the distance between the better-off households of the upper quintile (fifth) and the ones in the first quintile starts increasing monotonically, and in 2013 the parameter for the lowest quintile (first) reaches the value of 9.692.

It is noteworthy mentioning that, while in the pre-crisis time no significant difference has been observed for FOSH variable between households whose reference person is self-employed and households with reference person who is an employee, a retired or another inactive, in the post-crisis phase these latter households show a feebly higher FOSH, in particular for employees from 2010 onwards, while for the retired the rearrangement of the foodshare takes place later, since 2012.

Others factors have contributed, although to a minor extent, to the increase of foodshare among households residing in Italy. As far the level of education attained by the Reference Person, parameter estimates for low and medium

educated Reference Person (always significantly different from the reference category of high educated Reference Person, and always positive) reached their peaks in 2009 (respectively, 5.181 and 3.196) and 2011 (5.299 and 2.649), although for medium educated Reference Person the value observed in 2013 is the same as 2011. Looking at the household type, elderly people, single or in a couple, compared to a reference couple with 2 children, just after the first economic crisis, in 2009, worsened their conditions (parameter estimates were, respectively, 3.056 and 2.366), while during the second phase of the crisis, in 2012, they actually showed a feebly higher FOSH, which nevertheless reached values lower than 2009 (2.871 and 2.201). To be mentioned also the behaviour of other household typologies than single person and couples with or without children: since 2009 onwards their conditions slightly deteriorated, although with a lower magnitude (the peak was in 2013, when the parameter estimate was 1.385).

For HDS variable (Table 1, pooled data), again a time effect is observed; in this case, until 2010 time parameters are not significantly different from the reference year 2007, while they show a meaningful increase since 2011 (when HDS is 1.943 percentage points higher than that in 2007) to reach the highest value (3.333) in year 2012.

Table 2 Estimates of the Mixed and OLS regression model coefficients of household deprivation share

Variable	Pooled data	Y2007	Y2008	Y2009	Y2010	Y2011	Y2012	Y2013
Intercept	-2.389 **	-3.629 **	-6.416 **	-3.610 **	-2.787 *	-0.674	-1.568	-0.892
Y2007	0.000	-	-	-	-	-	-	-
Y2008	0.082	-	-	-	-	-	-	-
Y2009	-0.167	-	-	-	-	-	-	-
Y2010	-0.110	-	-	-	-	-	-	-
Y2011	1.943 **	-	-	-	-	-	-	-
Y2012	3.333 **	-	-	-	-	-	-	-
Y2013	2.507 **	-	-	-	-	-	-	-
North	-0.538 **	-0.642 **	-0.479 *	-0.121	-0.555 *	-0.474	-0.897 **	0.657 *
South	3.875 **	2.962 **	3.565 **	2.503 **	2.830 **	4.308 **	5.052 **	6.036 **
Centre	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
bigMC	0.524 **	0.942 **	0.958 **	1.511 **	1.283 **	-0.745 *	-0.115	0.447
smallM	-0.505 **	-0.922 **	-1.007 **	-0.126	-0.687 **	-0.270	-0.007	-0.393
mediumM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
lnhsize	0.492	1.843 **	3.453 **	0.925	0.104	0.932	1.230	-2.085 **
ageRP ^(a)	0.046 **	-0.010	-0.004	0.083 *	0.118 **	0.008	0.009	0.070
ageRPsquared ^(a)	-0.001 **	0.000	0.000	-0.001 **	-0.002 **	-0.001 *	-0.001	-0.001 **
eduRPlow ^(a)	3.244 **	2.887 **	2.989 **	3.624 **	3.354 **	5.456 **	5.450 **	3.823 **
eduRPmedium ^(a)	1.338 **	1.319 **	0.929 **	0.953 **	1.068 **	1.807 **	2.676 **	1.815 **
eduRPhigh^(a)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
actRPdep ^(a)	0.449 **	0.479	0.872 **	0.420	1.019 **	0.802 *	1.126 **	1.395 **
actRPret ^(a)	1.059 **	1.768 **	1.859 **	1.118 **	1.572 **	0.965	1.419 **	1.782 **
actRPOther ^(a)	4.105 **	5.058 **	5.470 **	4.042 **	4.818 **	5.061 **	6.327 **	6.519 **
actRPself^(a)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
nhhworker	-0.625 **	-0.030	0.027	-0.553 **	-0.624 **	-0.796 **	-1.044 **	-0.323
hhstype_spleast65	1.129 **	3.892 **	6.157 **	1.766 *	0.076	2.604 **	2.076 *	-1.819
hhstype_spleast65	0.292	1.569	2.927 **	0.026	-0.534	2.377 *	1.362	-2.544 *
hhstype_cnochildless65	-0.137	0.893	2.099 **	0.087	0.000	0.401	0.054	-1.682 **
hhstype_cnochildleast65	-0.805 **	-0.044	0.884	-0.629	-1.127	0.510	-1.365	-0.964
hhstype_c1child	0.209	0.717 *	1.140 **	0.873 *	-0.425	0.514	0.420	-0.375
hhstype_c3children	1.281 **	0.657	0.735	1.603 **	1.413 *	2.170 **	2.200 **	2.474 **
hhstype_sparent	1.734 **	3.185 **	3.985 **	3.050 **	1.048 *	1.841 **	1.759 **	0.691
hhstype_other	1.559 **	2.144 **	1.975 **	2.151 **	1.287 **	2.056 **	1.723 **	1.217 *
hhstype_c2children	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
house_rented	5.152 **	5.275 **	4.865 **	5.207 **	5.267 **	6.427 **	6.178 **	6.445 **
house_owned	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
quintile1	4.938 **	5.484 **	6.006 **	5.205 **	5.420 **	5.530 **	7.525 **	7.983 **
quintile2	2.163 **	1.614 **	2.065 **	1.523 **	1.303 **	1.753 **	3.323 **	3.451 **
quintile3	0.737 **	0.389	0.651 *	0.214	0.208	0.073	1.043 **	1.237 **
quintile4	0.115	0.109	0.339	-0.370	-0.135	-0.610	-0.028	0.128
quintile5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	138972	20982	20928	20492	19147	19399	19578	18486
adj-R-squared	-	0.1265	0.1344	0.1220	0.1289	0.1416	0.1622	0.1658
Chi-squared Likelihood Ratio (null model with only the fixed effects)	26552.43							
Pr>Chi-Squared	<0.0001							
* significant at p=0.05								
** significant at p=0.01								
^(a) RP, Reference Person=Bread Winner (BW)								

Among the factors associated with a higher HDS, the most important are: residing in the South, living in a household belonging to lower income quintiles, with a low-educated Bread Winner or where the Bread Winner is inactive (other than retired), living in a rented accommodation.

The disadvantage of residing in the South increased monotonically from 2009 onwards: in 2009, a household living in this geographical area had a HDS 2.503 percentage points higher than a household living in the Centre, and this estimate reaches the value of 6.036 in the year 2013. Also the magnitude of low and medium educated Bread Winner effects (always positive compared to high educated BW) increased during the crisis period, especially in 2011 and 2012 (when for low educated Bread Winner the estimate was 5.45, compared to the pre-crisis value of 2.887). Deprivation for low income households increased as well: in 2007, households in the first income quintile had a HDS 5.484 percentage points higher than the ones in the fifth quintile, while in 2013 this estimate was equal to 7.983. When the Bread Winner is self-employed (reference category) households suffer less from deprivation: after the economic crises manifested their effects, the relative disadvantage of inactive (other than retired) Bread Winner widened (6.327 in 2012 and 6.519 in 2013), while the conditions of households whose Bread Winner is an employee or a retired worsened less.

Others factors that have contributed to exacerbate HDS, but to a minor extent than the above mentioned, are firstly: being a single non-elderly person, a single parent or a couple with 3 or more children. However, in these cases the relative magnitude of the effect has changed across the analysed period. In the pre-crisis time, compared to a reference couple with 2 children, being a single person less than 65 years (6.157 in 2008) or a single parent (3.985 in 2008) worsened the HDS more than in the post-crisis time (respectively, 2.604 and 1.841 in 2011). The opposite happened for household with 3 or more children: from a non-significant difference from couple with 2 children in 2008, in 2011 the parameter estimate reached the value of 2.17; from that year onwards the situation for couples with 3 or more children has continued to deteriorate monotonically, up to the estimated effect of 2.474 in 2013. Until 2010, living in metropolis was associated to a slightly major extent of the HDS than in medium towns, while afterwards a minor or not significantly different association has been observed. As far the household size, in the pre-crisis time a positive effect was observed, which surprisingly changed sign in the last year of the considered period. Although further analyses are definitely required, one possible explanation is that in bigger households other than couples with 3 or more children (that have on the contrary a positive estimate in 2013), additional household members are elderly people who are likely to be retired. In this sense, they can contribute to improve household financial resources thanks to the guarantee represented by their pension income (that, for the lower amounts, was linked to the price indexes in the considered period), leading to a lower degree of material deprivation.

5 Concluding remarks

The economic crises of the last decade have had considerable effects on household living conditions in Italy, with a sharp decline, equal to -12.3%, of the average household income, and an even higher decline (-16.7%) for the average household consumption expenditure.

Stronger budget constraints have induced a moderate raise of foodshare and an enlargement of the share of population suffering from severe material deprivation. In particular, main evidences show that households residing in the South, belonging to lower income or expenditure quintiles, having a reference person with a low level of education, living in a rented dwelling and in large households (namely, other household typologies than single person and couples with or without children and couples with three or more children) are the ones hit hardest by the economic crises of the last decades; unfortunately, these population subgroups were already the most disadvantaged in the pre-crisis time.

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