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Decomposing Poverty in Hard Times: Greece 2007-2016

Eirini Andriopoulou, Eleni Kanavitsa and Panos Tsakloglou

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Contents

Abstract iii

1. Introduction **2**

2. Data and methods **4**

3. Empirical results **5**

3.1 Inter-temporal changes in aggregate poverty 5

3.2 Changes in the structure of poverty 9

4. Conclusions 25

Decomposing Poverty in Hard Times: Greece 2007-2016

Eirini Andriopoulou[*], Eleni Kanavitsa[†] and Panos Tsakloglou[‡]

ABSTRACT

The Greek economic crisis resulted in a decline in household disposable income by more than 40%. Even though all population groups lost income in absolute terms, some were substantially more severely hit by the crisis. The paper examines the effect of the crisis on the population shares, the mean incomes and the level of poverty of various population groups using SILC data for the period 2007-2016. The population is partitioned according to four criteria: socioeconomic group of the household head, presence of unemployed individuals in the household, age of the population member and household type. When "anchored" poverty lines and distribution-sensitive poverty indices are employed the level of poverty rises to incredibly high levels. When the poverty lines used are "relative", the poverty rate does not change substantially but when distribution-sensitive indices are used the increase in poverty is very substantial. The most interesting results are related to the changes in the structure of poverty. The crisis was associated with a very substantial increase in unemployment. Unemployment protection in Greece was inadequate while there was no "benefit of last resort". As a result, the relative position of households with unemployed members (and, especially, with unemployed heads) deteriorated sharply, while their contribution to aggregate poverty skyrocketed. Unlike what is often claimed in the Greek public discourse, the relative position of pensioner-headed households improved, although they also experienced a considerable decline in their living standards.

JEL Numbers: D31, I31, I32

Keywords: Greece, Poverty, Decomposition analysis, Crisis

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1. Introduction

The Greek crisis lasted almost a decade and resulted in a decline in GDP per capita by 26% in real terms and a much larger decline in equivalized disposable income by 42%. The cumulative fall in GDP was much larger than that of Argentina in 2000, Uruguay 1997 and of the countries of East Asian crisis. Actually, only in the USA 1929 deep recession, the fall in GDP was higher, yet the length of the crisis in all the above cases was substantially sorter, usually lasting two to four years, while in the case of Greece output declined for almost eight consecutive years and the rebound was much slower than in the aforementioned cases (see Graph A1 in the Appendix). In short, the Greek crisis is the deepest and longest ever recorded in an OECD country in the postwar period. The present paper studies how the living standards of the various population groups were affected by the crisis in both absolute and relative terms. It focuses on changes in mean disposable household income, poverty rates and poverty structure. The paper uses the latest available SILC data of the Hellenic Statistical Authority (ELSTAT) for the period 2007-2016[4]. The paper offers a useful insight into the income distribution in a unique period of recession, whose characteristics, structure and effects have not yet been studied systematically. In addition, the poverty decomposition analysis extents to many different population sub-groups that have not been studied in the past, highlighting the importance of changes in population shares during recessions.

Poverty in Greece in the pre-crisis years has been studied in quantitative terms in sufficient depth, using a number of data sets, primarily Household Budget Surveys, the European Community Household Panel (ECHP) and the EU-SILC (indicatively; Kanellopoulos, 1986; Tsakloglou, 1990; Tsakloglou and Panopoulou, 1998; Tsakloglou and Mitrakos, 2006; Papatheodorou and Petmesidou, 2006; Papatheodorou et al. 2008; Mitrakos and Tsakloglou, 2000, 2012a, 2012b). According to these studies, relative poverty recorded a modest decline from the 1970s until the eruption of the crisis. The decline was substantially larger when the poverty line used was “anchored” in real purchasing power terms. In 1970s and 1980s poverty was primarily a rural phenomenon, while in 1990s with the declining importance of the agricultural sector and the rise in agricultural incomes due to the Common Agricultural Policy of the EU, the elderly became the largest group in poverty, although they did not experience extreme poverty (Andriopoulou and Tsakloglou, 2010; Katsikas et al., 2015). In all periods, relative poverty in Greece was consistently found to be higher than the EU average, while there was evidence that poverty was, to some extent, “state dependent”; that is, once people were falling below the poverty line, they tended to stay longer in poverty irrespective of their characteristics (Andriopoulou and Tsakloglou, 2011; 2015) and considerable overlap could be observed between the groups of the “poor” and the “socially excluded” (Andriopoulou et al., 2013).

[4] SILC data come with one-year lag on income components. Thus the latest available SILC wave of 2017 gives information for 2016 incomes.

"Poverty" and, to a lesser extent, "inequality" were almost constantly at the forefront of the public discourse in the years of the crisis. The main claims made in this discourse was that poverty and inequality rose steeply during the crisis and that successive pension cuts led to the impoverishment of large segments of the elderly population. The Greek welfare state appeared unprepared to meet the challenges of extensive poverty and social exclusion which grew as a result of austerity measures taken to achieve Greece's fiscal consolidation (Sotiropoulos, 2018). A number of empirical investigations can be found in the literature examining in depth the above claims, as well as the effects of particular policies adopted in recent years (Artelaris and Kandylis, 2014; Katsikas et al., 2015; Kaplanoglou and Rapanos, 2018). They use a variety of data and methods, some use real data and some simulated estimates, while the observation period varies across studies and, hence, their results are not always strictly comparable. Nonetheless, they confirm that poverty rates rose during the crisis, especially when "anchored" poverty lines are used and poor people appear to become poorer even in relative income, when their "intensity of poverty" is examined.

More specifically, by studying the distributional effects of several policies implemented during the economic crisis, Matsaganis and Leventi (2013; 2014a; 2014b) pointed out that poverty in relative income terms has risen marginally from 20% in 2009 to 21.3% in 2012. Although, when "anchored" poverty line is employed at pre-crisis levels, its increase reaches 37% of the population in 2012, which is significantly higher than in other Southern European countries, notably Spain, Portugal and Italy. Moreover, in the aforementioned countries, relative poverty rates seemed to be stable or even decreasing until 2012, but thereafter they faced increasing poverty rates too (Giannitsis and Zografakis, 2018). Changes in the structure of the population below the (relative) poverty line during the early years of the crisis can be found in Mitrakos (2014), Koutsogeorgopoulou et al. (2014) and Giannitsis and Zografakis (2018) who report a shift in poverty from older segments of the population to younger and better educated population strata.

To some degree, the paper deepens and extends in time the analysis of Andriopoulou, Karakitsios and Tsakloglou (2018). It provides a detailed picture of the evolution in the level and structure of poverty in Greece during the period 2007-2016, moving beyond simple poverty rates, focusing on specific population groups and drawing policy implications that are likely to be of interest to other developed and developing countries embarking on fiscal stabilization efforts. The remaining of the paper is organized as follows. Section 2 deals with data and methodological issues. Section 3 presents and discusses the empirical findings of the paper, first, for inter-temporal changes in poverty and then, for changes in the structure of poverty across population sub-groups, and Section 4 presents the conclusions and policy implications of the empirical findings.

2. Data and methods

The data used in our analysis come from the Greek data set of the SILC (Statistics of Income and Living Conditions) for the period 2008-2017. Since the income information of the participating households refers to the previous year, we denote our timeframe as "2007-2016". The SILC is the national component of the EU-SILC, a harmonized cross-national longitudinal survey, carried out annually in all EU member-states (as well as Norway and Switzerland). It is a truly rich data set providing detailed information on income, employment, health, education, housing, migration, social transfers and social participation, as well as socio-demographic characteristics of the participating households and their members. It is a rotational panel and each household remains in the sample for up to four consecutive years. For the purposes of our analysis, we use the cross-sectional information for the waves 2008-2017 (incomes 2007-2016).

The concept of resources used in our analysis is "disposable monetary household income"; that is the sum of monetary incomes of all household members from all sources after the subtraction of direct taxes and social insurance contributions. Despite its popularity, it is not entirely clear whether monetary income is the most appropriate concept of resources for distributional studies (Deaton, 1993; Tsakloglou and Papadopoulos, 2002; Tsui, 2002; Deutsch and Silber, 2005; Kakwani and Silber, 2008), especially in turbulent periods when people might rely more intensively on their accumulated wealth or resources in kind of the welfare state in order to sustain their standard of living. In order to take into account differences in needs of households with differences in size and composition, household incomes are standardized using the modified OECD household equivalence scales, also used by Eurostat. These scales assign a weight of 1.0 to the household head, 0.3 to each household member aged below 14 and 0.5 to the remaining household members.

Changes in the level of aggregate poverty are measured using the Foster et al. (1984) parametric family of indices (FGT) when setting the value of the poverty aversion parameter to 0, 1 and 2 (FGT0, FGT1 and FGT2, respectively). FGT0 is the most well-known index of poverty, the poverty rate, counting the proportion of population that falls below the poverty line. FGT1 is the "income gap ratio"; that is, the share of the total income that would be needed to eliminate poverty. FGT1 is not sensitive to the extent of inequality among the poor (and, hence to the extent of extreme poverty), while FGT0 is sensitive to neither the average depth of poverty nor the extent of inequality among the poor. Of the indices used here, only FGT2 satisfies the standard axioms of poverty measurement (focus, symmetry, monotonicity, ranked deprivation, normalization and transfer; Foster, 1984; Seidl, 1988; Zheng, 1997; 2000). Although all members of the Foster et al. (1984) family of indices are "additively decomposable"; that is, they can identify the contribution of each population group to aggregate poverty when the population is grouped into non-overlapping and exhaustive groups, due to space limitations, for the purposes of the analysis of the structure of poverty we rely on FGT0 and FGT2. Yet, the great advantage of these indices is that the decomposition is straightforward, which is not the case with all poverty indices (see for example Xu and Osberg, 2001; Chakravarty, Deutsch and Silber, 2008).

Unlike inequality that is a "relative" concept, poverty can be used in "relative" or "absolute" terms; the former is the standard practice of the European Commission and other international organizations, the latter might give interesting results in periods of changes in average incomes as the one examined in the paper. The "floating" ("relative") poverty lines used are those of Eurostat that set the poverty line equal to 60% of the median equivalized income of the contemporaneous income distribution. The "anchored" ("absolute") poverty line is the poverty line of the base year (2007) adjusted for the cost of living for each subsequent year using the consumer price index of the Hellenic Statistical Authority (ELSTAT).

Following the practice of several international organizations, we applied "top and bottom coding" to our samples; that is, we removed a number of observations from the two ends of the distribution. More specifically, following the practice of the Luxembourg Income Study (LIS) database, we removed households with equivalized incomes less than 1% and more than ten times the mean equivalized income of the corresponding distribution. Almost all the observations removed - less than 1% of the sample in most years – were located to the bottom end of the distribution and were negative or zero incomes (see Table A1 in the Appendix). Undoubtedly, the treatment of extreme incomes – especially those at the bottom end of the distribution - is not uncontroversial and one could expect that the number of households with zero or negative incomes would rise in crisis periods. The evidence of Table A1 is not entirely clear, since the pattern reported there is anything but uniform (in fact, the lowest share of non-positive incomes is recorder in the year corresponding to the peak of the crisis). As shown in Table A1, the exclusion of these observations leads to an underestimation of total poverty rate by 0.5% in most of the cases as compared to the full sample[5].

3. Empirical results

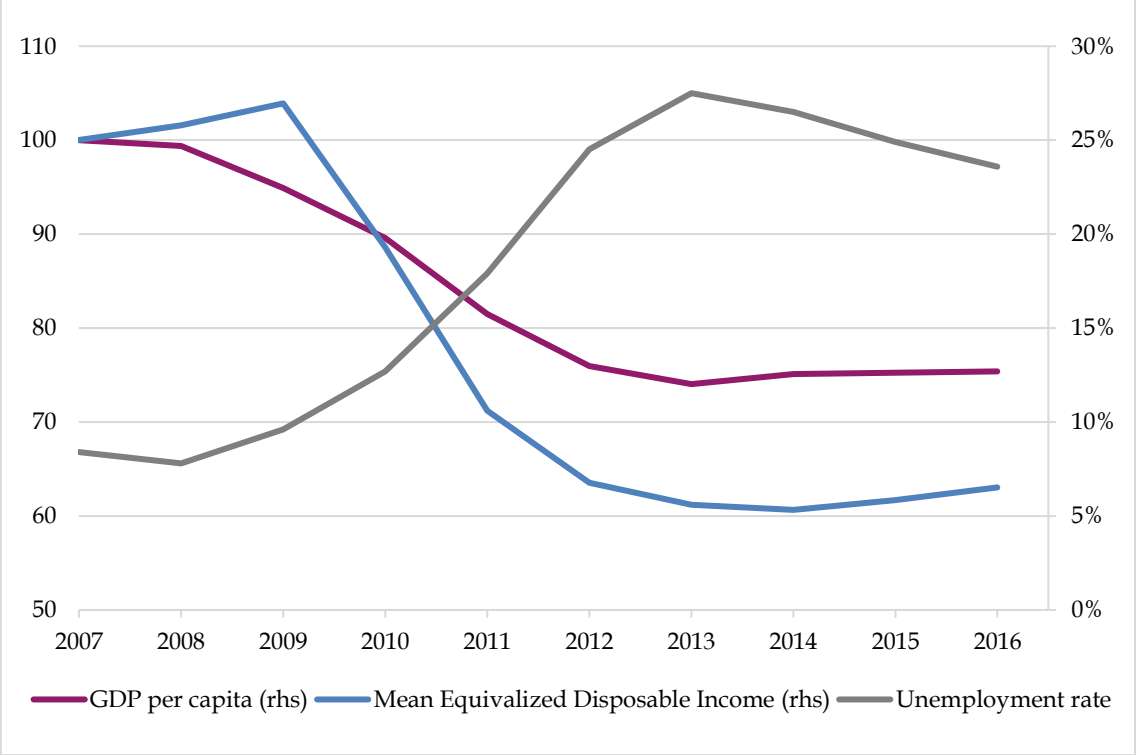
3.1. Inter-temporal changes in aggregate poverty

Graph 1 depicts the evolution of mean equivalized disposable income, GDP per capita and unemployment rate during the period under consideration (2007-2016). In the first years of the crisis, while GDP had started to decline, the disposable income of households continued to increase and started declining with a time-lag of two years. Yet, the decline in the mean equivalized disposable income was sharper than the decline in GDP per capita, resulting in a 42% decrease between 2009 and 2014, while the largest drop in GDP per capita was 25% between 2007 and 2013. The increase in disposable income in the first two years under examination, despite the substantial decline in GDP is due to the fact that the government implicitly tried to counter recession with expansionary measures that resulted in a ballooning of public debt. The fiscal consolidation that started in 2010 was roughly equally based on tax increases and expenditure cuts, but the composition of these measures varied over time. The first (2010-2011) and, especially, the third (2015-2018) Economic Adjustment Programs relied

[5] In most cases the results derived from the use of the full sample are not substantially different than those reported below and are available from the authors on request.

more on tax increases, while the second (2012-2014) focused primarily on expenditure cuts (Tsakloglou et al., 2016; Meghir et al., 2017). Further, the population of Greece was continuously declining in this period, mainly as a result of "brain drain"[6]. As a consequence, the cumulative decline in GDP per capita is marginally lower than the decline in total GDP. The fact that the decrease in mean equivalized disposable income is larger than the drop in GDP per capita is due to the fact that a very considerable proportion of the stabilization effort relied on tax increases that reduced the real disposable income of the population more than the effects of nominal cuts in wages, pensions and social transfers either directly (income and property taxes) or indirectly (expenditure taxes). According to Filinis et al. (2018), in the decade before the outbreak of the crisis, although Greece on average outperformed both the EU and the Euro area in terms of growth rates, unemployment in Greece was well above the respective European averages, while it skyrocketed from 7.8% in 2008 to 27.5% in 2013. After 2013, the rate of decrease in unemployment is much higher than the rate of increase in the mean equivalized disposable income and GDP per capita.[7]

Graph 1: Mean equivalized disposable income, GDP per capita (2010 prices) and unemployment rate

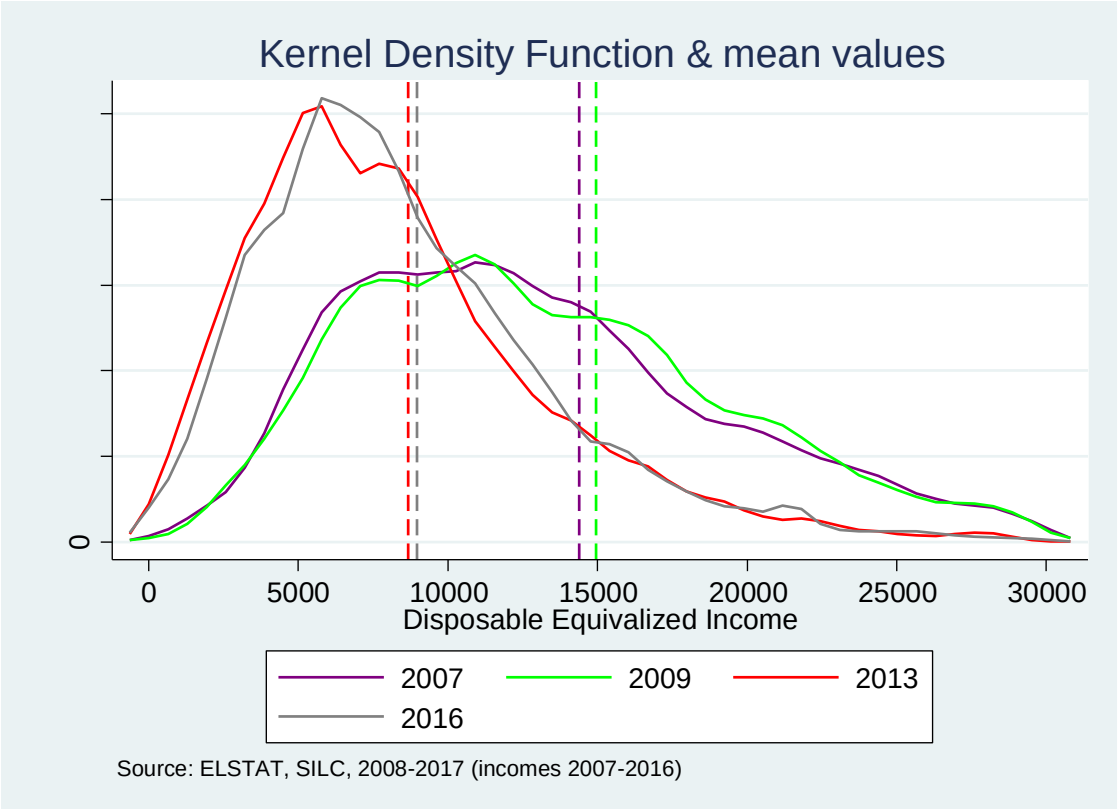


Note: Mean equivalized disposable income and GDP per capita (2007:100, lhs); unemployment rate (rhs).
Source: AMECO and Hellenic Statistical Authority (ELSTAT).

[6] The total decline of the population in the period of examination is 2.4% (ELSTAT, http://www.statistics.gr/el/statistics/-/publication/SPO18/-))
[7] This trend continued in the years after the reference period of this paper.

The shift in the entire income distribution to the left that took place between 2007 and 2016 is illustrated in Graph 2. More specifically, the graph shows the distributions of equivalized disposable income per capita in constant prices using kernel density functions. 2007 is the last year with a positive growth rate before the crisis, 2009 is the year with the highest disposable income, 2013 is the peak of the crisis and 2016 the end of the observation period. A massive shift of the distribution to the left is evident. The graph shows a higher concentration around the mode in 2013 and 2016 than in 2007 and 2009 that, prima facie, could be an indication of a decline in inequality. However, many more observations are concentrated close to the bottom of the distribution in 2013 and 2016 than in 2007 and 2009, operating in the opposite direction[8]. A small improvement of bottom and middle-class incomes is observed in 2016 compared to 2013.

Graph 2: Evolution of equivalized disposable income and mean values 2007, 2009, 2013 and 2016



[8] Note also that, for exposition purposes, both distributions are cut off at the annual level of 30,000 euros per capita (in equivalized terms). Naturally, the distributions of 2007 and 2009 have a fatter right tail above this threshold than the distributions of 2013 and 2016.

Graph 3 presents the evolution of the three poverty indices used in the paper employing both "floating" (red lines) and "anchored" (blue lines) poverty thresholds when their values are standardized to 100 for the base year (2007). Moreover, the evolution of Eurostat's index of material deprivation is depicted (also standardized to 100 for the base year). When "floating" poverty lines are used, the indices remain stable for the first couple of years and, then, start rising until 2012 but in a very different pattern. During this period, 2009-2012, the estimate of the poverty rate (FGT0), rises by almost 15% whereas the estimates of FGT1 and FGT2 rise by around 50% and 87%, respectively. Clearly, not only there was an increase in the share of the population falling below the poverty line but also a decline in the incomes of the poor vis-à-vis the poverty line (increase in the "depth" of poverty) and an increase in inequality among the poor, as the distributional sensitive indices indicate. From 2012 to 2015, there is a small steady decline in all indices, and between 2015 and 2016 a larger decline of 5.7%for FGT0, 13.5% for FGT1 and 25% for FGT2 is observed. The value of FGT0 in 2016 is at the same level as it was at the beginning of the period, i.e. 19.8%. Nevertheless, the values of the distribution-sensitive indices are still much higher in 2016 than in 2007 (FGT1 by 24% and FGT2 by 45%).[9]

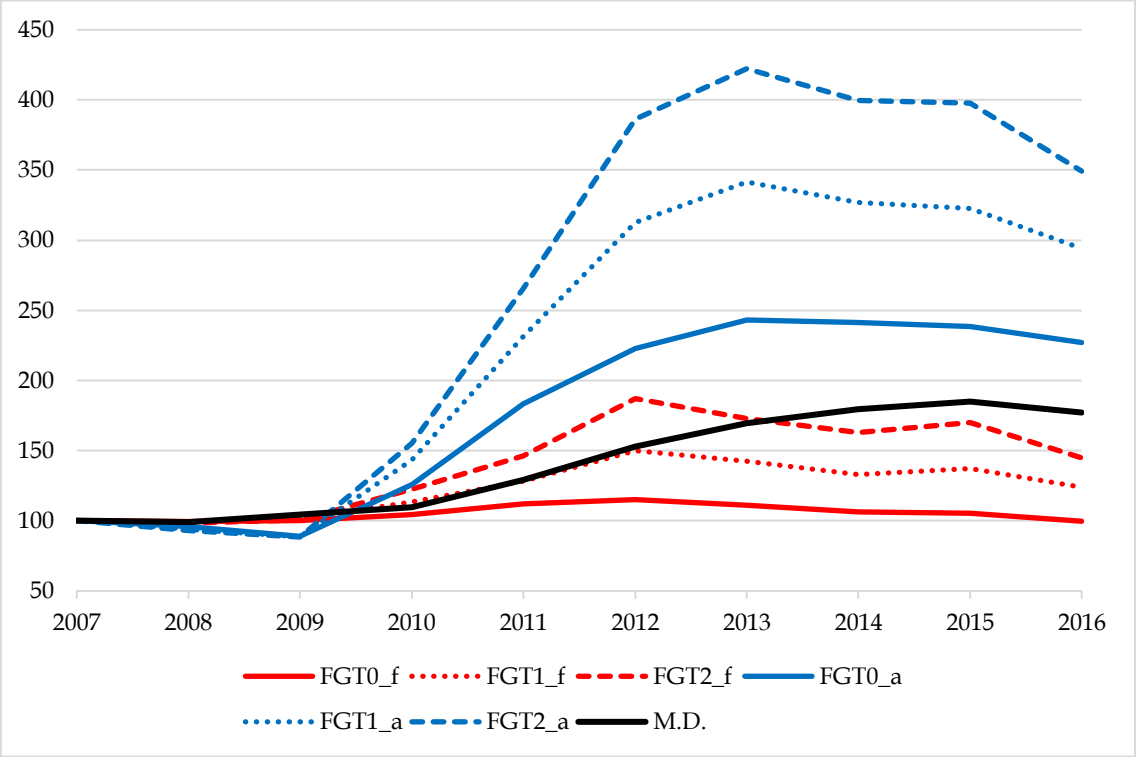
The pattern is very different when the "anchored" poverty line is used, fixed in real terms[10] to its value in 2007. Despite the decline in GDP per capita, in 2008 and 2009 all indices decrease substantially, by almost 12% cumulatively. However, in the period 2009-2013 their values rise sharply. FGT0 is thus 243% higher compared to its 2007 level, FGT1 341% and FGT2 422%, respectively. Practically, this indicates that with the poverty line of 2007, at the peak of the crisis in 2013, 48% of the Greek population would be classified as poor. After 2013, all indices gradually decline – especially the distribution-sensitive ones.

The pattern of the Material Deprivation index (M.D.) is rather different. It rises almost continuously in the years under consideration; quite slowly until 2010 and substantially faster until 2015 when it stabilizes, reaching a level that is almost 80% higher than the base year in the final year under examination.

[9] The intertemporal pattern of the poverty indices when "floating" poverty lines are used resembles a little the intertemporal pattern of inequality indices reported in Graph A2 of the Appendix. This applies especially to the FGT0 and the inequality index that is the most sensitive to changes close to the bottom of the distribution among those used in Graph A2 (Mean Log Deviation – MLD).

[10] The 2007 poverty line has been deflated/inflated in each year using the Consumer Price Index of the Hellenic Statistical Authority (ELSTAT).

Graph 3: Inter-temporal changes in poverty and material deprivation indices (2007-2016; 2007:100)



Source: Authors' calculations using SILC 2008-2017 (ELSTAT) and Eurostat.

3.2. Changes in the structure of poverty

Changes in the structure of poverty are directly related with changes in the share of population groups under examination. Thus, presenting the changes in population shares of the different groups and understanding the driving forces of the changes is crucial for interpreting the effects of the recession on income distribution and poverty structure. For the purposes of our analysis, the population is grouped using four criteria. The first criterion is the socio-economic group of the household head. Eight groups are formed: Self-employed with employees, Self-employed without employees in the agricultural sector, Self-employed without employees outside agriculture, Private sector employees, Public sector employees, Unemployed, Pensioners and "Other" (mainly including inactive individuals like domestic careers, discouraged workers, students, persons in military service etc.). Given the great increase of unemployment in the period under examination and that a very large proportion of the unemployed are not household heads, a companion to the first criterion, is the presence of at least one unemployed member in the household.

The third criterion splits the sample according to the age of the population member into "young" (below 18), "working age" (18-64) and "old" (65 or over) age groups. During the period under consideration, the population of Greece declined by 2.3%. This was a consequence of population ageing and especially, for the first time since the mid-1970s, net emigration. In total, 665 thousand individuals immigrated to Greece, while 846 thousand emigrated from the

country. More specifically, according to ELSTAT, in the first three years 2007-2009, there was a net inflow of around 60 thousand immigrants to Greece. In the next five years, 2010-2015, 612 thousand persons emigrated from Greece (many of them former immigrants to the country) and the net outflow was approximately 250 thousand persons. The great majority of the emigrants were working age individuals, mainly young and relatively well educated. Partly as a result of this emigration of relatively young persons, a sharp drop in the number of births is observed in the country between 2007 (112 thousand) and 2016 (93 thousand), a drop close to 17%. In 2016, the net migration balance turns positive, and the births slightly increase compared to 2007.

Using the fourth criterion, the population is split according to the household type of the individual into seven groups: "younger" single member households or couples with both members aged below 65, "older" single member households and couples with at least one member aged 65 or more, couples with "one or two" and "three or more" dependent children and no other household members, mono-parental households and other household types "with" or "without" dependent children.

Table 1 presents changes in population shares and relative mean incomes for the years 2007 (the last year before the recession), 2013 (the peak of the crisis) and 2016 (the last year of the period under examination). In columns A-C the population shares of each sub-group are presented for the three years. In columns D-F we present the mean income of the group divided by the mean income of the total population, thus depicting the relative position of the sub-group towards the population mean. Lastly, in columns G and H, the mean income change in real terms is calculated broken down in two periods, change between 2007 and 2013 (column G) and change between 2013 and 2016 (column H). It should be noted that, the unit of analysis is the individual, not the household. For example, in the first part of the panel columns A-C is the share of individuals living in households with a household head having the respective socioeconomic status.

One distinguishing feature of the Greek labour market is the large share of the self-employed. According to the OECD[11], the share of the self-employed among all employed persons in Greece is the second largest across OECD countries and by far the largest in the EU. Despite a substantial decline in the number of self-employed in absolute terms, because of the total decrease in employment, the share increased to 37.0% in 2013, compared to 16.5% in the EU and dropped to 34.1% in 2016 vs 15.8% in the EU[12]. As shown in Table 1, the share of individuals living with a self-employed head to the total population dropped consecutively from 2007 to 2013 and then to 2016, with the exception of the "self-employed without employees in agriculture" of whom the share rebounded in 2016. Although, the mean income of the population living in households with a "self-employed with employees" head declined both in

[11] https://data.oecd.org/emp/self-employment-rate.htm

[12] The relative increase is mainly due to an increase in self-employment in the tertiary sector - 3.5p.p. rise in comparison to the beginning of the crisis. The share of self-employed with employees and, particularly, those working in the secondary sector declined to half. On the contrary, it was the share of self-employed without employees, mainly in the tertiary sector that increased.

real terms and in relation to the mean income, it remains much above the mean income of the population in all years while, it is 36% higher at the end of the observation period. On the contrary, the mean income of the population living with a "self-employed without employees" head that works in agricultural activities is much below the mean income in all years, but significantly improved between 2013 and 2016. Also, unlike the rest of the population, this population sub-group is likely to have in-kind incomes in the form of consumption of own agricultural production. Members of households headed by "self-employed without employees in non-agricultural activities" have mean income closer to the national average at the beginning and end of the observation period, while temporarily improved its relative position at the peak of the crisis, despite the fact that in real terms presents dropping incomes in both sub-periods.

The shares of population groups with head employed in either private or public sector decrease between 2007 and 2013. Yet, the share increases substantially between 2013 and 2016 for the private sector employees (reaches 19.9% in 2016), and slightly for public sector employees (11.5%), in line with the decline in the aggregate unemployment rate. The relative income of individuals living in households with a private employee as head is close to the mean income, while for households with head being an employee in the public sector is much higher – almost a quarter above the national average. This evidence runs contrary to the claim often made in the public discourse that although public sector employees did not experience unemployment, they paid a very high price since their salaries were reduced far more than private sector salaries. The change of incomes for both groups is large and negative in absolute terms between 2007 and 2013, and slightly improves between 2013 and 2016.

Despite almost two decades of robust growth rates, in the years before the crisis, the rate of unemployment in Greece was higher than in most European countries. According to Eurostat, in 2007 Greece's unemployment rate was 8.4% versus the EU27 average of 7.2%. What is even more telling is that in the same year, both youth and female unemployment rates were the highest among all EU countries; the corresponding rates for Greece and the EU being 22.7% vs 15.8% and 12.9% vs 7.9%, respectively. This can be considered as a clear indication of a dysfunctional labour market. The main effect of the crisis was the spectacular rise in the unemployment rate. By 2013, the unemployment rate had climbed to 27.5%. This is reflected in our data too. Between 2007 and 2013, the share of the population living in households headed by unemployed persons rose from 3.3% to 13.0%, and then dropped to 11.1% in 2016. Furthermore, even though the mean income of the group was only 68% of the national average in 2007, it dropped to 62% in 2013 and further to 59% in 2016, despite the small decline in unemployment. This should be attributed partly to the fact that between these years long-term unemployment shot up (in 2013 around three quarters of the unemployed were long-term unemployed) and the income protection for this group was almost non-existent. Besides the gradual ageing of the population, several people who were close to retirement chose to exit the labour market and take early retirement, during the crisis. In our data, this is reflected in

the rise of persons living in households headed by pensioners from 24.5% to 29.5% in 2013.[13] However, unlike what is often heard in the public discourse, the relative income position of this group rose during the crisis (even though it decreased substantially in real terms). In 2007, on average the members of the group had incomes 4% lower than the population mean. By 2013 their incomes were 8% higher than the national average and in 2016 the percent was marginally higher at 9%. Naturally, the increase in the share of these two groups was counterbalanced by the decline on the share of the population living in households with employed heads. This is evident in columns A, B and C but the effect was not symmetric for all groups.

The second panel of the table is, essentially, a companion to the first panel. As noted earlier, a very large proportion of the unemployed are not household heads and there are many households with unemployed members. In this panel the partitioning criterion is the presence of at least one unemployed member in the household. In 2007, 11.9% of the population was living in households with at least one unemployed member. By 2013 this figure had risen to 33.5% and then declined to 29.2% in 2016. Moreover, the relative mean income of this group declined from 78% to 75% in 2013 and further to 71% of the mean national income in 2016.

In the third panel of the table, the population is grouped according to the age of the population member into "young" (below 18), "working age" (18-64) and "old" (65 or over). Two points are worth-making and they are also in line with earlier findings; first, the substantial increase – in such a short period of time - in the share of the old by 3.3% and the corresponding decline in the share of the working age population. Second, the substantial improvement in the relative income position of the elderly who in 2007 were 12% below the national average but at the end of the period they moved marginally above it. Between 2007 and 2013, all age groups lost income in real terms. The largest drop was for the working age population (almost 42%), while between 2013 and 2016 the working age population increased its income by 3.5%. Yet, the elderly lost less (33%) in the first sub-period and gained more (5.5%) in real terms during the second sub-period under consideration. Children seem to be the most affected age group, as the drop of income was as high as for the working age group, but the rebound in incomes of households with children is much less than the other groups (only 0.4% between 2013 and 2016).

[13] Note that this share declines to 27.9% in 2016. This is due to the fact that in the onset of the crisis, several workers qualifying for a pension either chose retirement over unemployment or to get into retirement before the change of the rules for pension eligibility (that made early retirement far more difficult), thus swelling the ranks of the pensioners. Naturally, in the following years the inflow into retirement was substantially slower. These shifts are reflected in the figures of Table 1.

Table 1. Population shares and relative mean incomes: 2007, 2013 and 2016

Population Group	Population share			Mean income			Change in real terms	
	2007	2013	2016	2007	2013	2016	2007-13	2013-16
	A	B	C	D	E	F	G	H
Socio-economic group of household head								
Self-employed with employees	5.2	3.8	3.6	1.50	1.42	1.36	-43.2	-1.3
Self-employed without employees (agriculture)	5.1	4.6	5.1	0.64	0.59	0.83	-44.4	44.7
Self-employed without employees (non-agriculture)	9.7	9.0	7.9	1.02	1.13	1.06	-34.1	-2.6
Employee (private sector)	21.6	16.9	19.9	1.00	1.10	1.07	-34.3	0.6
Employee (public sector)	15.2	11.2	11.5	1.28	1.26	1.26	-41.1	3.2
Unemployed	3.3	13.0	11.1	0.68	0.62	0.59	-45.6	0.0
Pensioner	24.5	29.5	27.9	0.96	1.08	1.09	-32.8	4.5
Other	15.3	12.0	13.0	0.78	0.78	0.75	-40.6	0.5
Households with/without unemployed								
No unemployed household member	88.1	66.5	70.8	1.03	1.13	1.12	-34.3	2.9
At least one unemployed household member	11.9	33.5	29.2	0.78	0.75	0.71	-42.4	-2.2
Age of population member								
Up to 17	16.5	16.6	16.4	0.98	0.97	0.94	-40.7	0.4
18-64	64.4	62.1	61.2	1.04	1.01	1.01	-41.7	3.5
65 or over	19.1	21.4	22.4	0.88	0.99	1.01	-32.7	5.5
Household type								
One person 65- or childless couple (both 65-)	10.4	12.5	11.4	1.18	1.13	1.17	-42.5	6.8
One person 65+ or childless couple (both 65+)	12.8	16.2	16.5	0.86	0.97	0.99	-32.5	5.8
Other household type no children dependent	27.1	21.3	22.8	1.06	1.05	1.05	-40.7	3.4
Mono-parental household	1.7	2.1	1.9	0.84	0.73	0.80	-47.8	13.4
Couple with 1 or 2 children dependent	31.7	28.5	26.4	1.02	1.08	1.02	-37.0	-2.0
Couple with 3+ dependent children	2.3	4.4	5.3	0.91	0.79	0.78	-47.6	1.5
Other household type with at least 1 dependent child	14.0	15.0	15.7	0.85	0.80	0.88	-43.8	13.2
GREECE				14377.7	8671.2	8965.75	-40.1	3.4

The changes of population ageing and net migration described above are reflected in the demographic structure of the households depicted in the fourth panel of Table 1. Fewer people were living in households with one or two dependent children in 2016 than in 2007 and there was a substantial increase in the share of elderly households (single member households or couples with at least one member aged 65 or more). In line with earlier findings, the relative income position of the elderly individuals living alone improves substantially (in 2007 their mean income was 14% lower than the national average, whereas in 2013 only 3% lower and in 2016 they were on parity). On the contrary, the relative income position of the small but vulnerable groups of mono-parental households and, especially, households with three or more children deteriorates, possibly due to a disproportional effect of unemployment on these household types. As far as income changes in real terms is concerned, what is interesting is that between 2013 and 2016 all household types increased their income in real terms with the exception of households with one or two kids that experienced a further decrease.

Table 2 presents changes in the structure of poverty between the last year before the decline in output (2007), the peak of the crisis (2013) and end of the observation period (2016). Columns A-C show the estimates of FGT0 (poverty rate) for the various groups in the three years using contemporaneous ("floating") poverty lines, set at 60% of the median equivalized income of the population in the corresponding year. Columns D-E show the relative change between years 2007-2013 and 2013-2016, respectively. As already mentioned, despite its popularity, the poverty rate (FGT0) cannot be considered as a satisfactory poverty indicator, since it ignores both the average intensity of poverty in each group (group mean distance from the poverty line) and the extent of inequality in the distribution of income among the poor. FGT2 does not suffer from such disadvantages and, further, like FGT0, it is additively decomposable – something that explains its popularity in empirical poverty studies. Columns F-H present the results for FGT2 for 2007, 2013 and 2016, respectively. In the last two columns I and J, the changes of FGT2 are displayed for the sub-periods 2007-2013 and 2013-2016.

As shown at the bottom of the table, in 2007, 19.8% of the population was falling below the poverty line, while by 2013 this percentage had risen to 22.0% before declining to 19.8% in 2016. Starting from the first panel of Table 1, the estimates reported in column A reveal that in 2007 there were two population groups with poverty rates exceeding the national average by a wide margin: members of households headed by self-employed without employees in the agricultural sector (40.0%) and unemployed persons (32.1%). By 2013 the poverty rate of the group of persons living in households headed by unemployed individuals rose to 49.3% and remained at this level up to 2016, while that of the members of households headed by self-employed without employees in the agricultural sector increased further to 45.3% and then dropped to 34.2%. What is interesting is that the poverty rate of the members of households headed by pensioners dropped from 18.5% to 12.3% and then to 9.0%. At the other extreme, in all years, poverty appears to be a rare phenomenon in households headed by public sector employees. The relative rankings of the groups when using the FGT0 are similar with those reported when using FGT2, albeit with more marked quantitative

differences between groups – broadly in line with the group mean incomes and their evolution reported in Table 1. In both cases, two groups stand out as high poverty risk groups: members of households headed by self-employed in agriculture and members of households headed by unemployed persons. Nonetheless, in all years when using FGT2 poverty is much higher in the latter group.

A similar picture emerges in the second panel of the table where the population is grouped according to the existence of unemployed members in the household. In all years, the group of individuals living in households with unemployed members was facing a markedly higher poverty risk than the rest of the population using both poverty indicators. When FGT0 is used, poverty increases through the years, while with FGT2 it increases between 2007 and 2013, and remains stable between 2013 and 2016. In the third panel, the partitioning criterion is the age of the population member. Naturally, the poverty estimates of the large population group of working age individuals (aged 18-64) is close to the national average. Between 2007 and 2013, we observe an increase in the poverty risks of the children (almost three percentage points) and a substantial decline in the poverty risks of the elderly (eight percentage points). Between 2013 and 2016, the poverty rate for the elderly dropped further to 12.0%, and for children dropped slightly, but remained far above the national average (24.6% vs 19.8%). When the population is split by household type in the last panel of Table 2, vulnerable households such as mono-parental households and households with 3+ children, as well as "other household type with no dependent children" suffered the highest increase in poverty rates in the period under examination irrespective of the poverty index used.

In Table 3, the contribution of the population sub-groups to total poverty is examined, using the "floating" poverty line. In 2007, the bulk of the poor could be found in households headed by other inactive individuals like domestic careers, discouraged workers, students, persons in military service etc. (almost a quarter of the total poverty can be attributed to this groups), pensioners (23.0%) and private sector employees (16.1%). By 2013, the situation was very different. As a consequence of the changes in the mean incomes and, especially, the population shares presented in Table 1, there was a dramatic change in the composition of the poor. In 2013, the most important contributor to aggregate poverty was the group of persons living in households headed by unemployed persons (29.0%, as compared to 5.4% in 2007), while, despite the increase in its population share, the contribution of the group of individuals living in households headed by pensioners dropped to 16.5%. At the end of the observation period (2016), the groups of the unemployed and other inactive individuals remain the main contributors of total poverty, contributing about 27.5% and 21.1% respectively. On the other hand, the group of individuals living in households headed by pensioners decreased further its contribution to the poverty rate to 12.8%. When FGT2 is used, the contribution of all groups drops from 2007 to 2016, with the exception of the group headed by unemployed individuals that skyrockets from 10.1% to 40.5%.

Table 2. Structure and inter-temporal change in poverty: 2007, 2013 and 2016 (floating poverty lines)

Population Group	Poverty rate (FGT0)			Change (%)		FGT2			Change (%)	
	2007	2013	2016	2007-13	2013-16	2007	2013	2016	2007-13	2013-16
	A	B	C	D	E	F	G	H	I	J
Socio-economic group of household head										
Self-employed with employees	16.5	15.4	18.7	-6.6	21.5	2.14	2.00	2.56	-6.4	28.1
Self-employed without employees (agriculture)	40.0	45.3	34.2	13.3	-24.7	4.25	8.15	5.03	92.7	-38.6
Self-employed without employees (non-agriculture)	29.4	23.5	23.9	-20.1	1.3	4.08	4.28	3.65	5.0	-15.0
Employee (private sector)	14.8	18.8	14.1	27.4	-25.5	1.66	2.41	1.56	45.5	-35.4
Employee (public sector)	4.1	2.5	4.5	-38.8	78.5	0.50	0.32	0.47	-36.0	47.2
Unemployed	32.1	49.3	49.1	54.1	-0.5	6.96	11.79	12.04	70.2	2.1
Pensioner	18.5	12.3	9.1	-34.1	-26.4	1.20	1.25	0.79	4.5	-37.2
Other	30.4	31.1	32.2	2.3	3.7	3.87	6.26	5.67	62.4	-9.5
Households with/without unemployed										
No unemployed household member	18.6	15.0	12.4	-19.6	-17.1	1.92	2.08	1.52	8.4	-27.2
At least one unemployed household member	28.9	35.9	37.5	24.5	4.4	4.90	7.61	7.59	55.8	-0.2
Age of population member										
Up to 17	22.7	25.6	24.6	13.2	-4.1	2.90	4.87	3.95	69.0	-19.1
18-64	18.3	23.5	21.3	28.6	-9.4	2.32	4.51	3.87	95.0	-14.3
65 or over	22.5	14.9	12.0	-34.3	-19.2	1.57	1.52	1.24	-3.0	-18.5
Household type										
One person 65- or childless couple (both 65-)	16.6	19.8	17.4	19.7	-12.0	2.2	4.0	3.7	79.4	-6.6
One person 65+ or childless couple (both 65+)	23.8	13.6	11.4	-43.3	-16.5	1.6	1.5	1.1	-4.4	-28.5
Other household type no children dependent	13.9	20.4	16.8	47.9	-18.2	1.5	3.1	2.9	103.1	-8.8
Mono-parental household	25.9	35.3	29.0	37.3	-18.1	3.6	9.7	5.4	172.4	-44.7
Couple with 1 or 2 children dependent	19.9	20.9	21.2	5.1	1.4	2.6	3.9	3.3	49.6	-13.6
Couple with 3+ dependent children	30.6	36.6	29.2	20.0	-20.6	3.4	7.3	5.1	114.3	-30.6
Other household type with at least 1 dependent child	27.6	31.2	28.0	13.0	-10.1	3.3	6.0	5.0	82.3	-16.5
GREECE	19.8	22.0	19.8	11.1	-10.2	2.27	3.93	3.30	73.7	-16.4

Table 3. Contributions to aggregate poverty: 2007, 2013 and 2016 (floating poverty lines)

Population Group	Poverty rate (FGT0)			Change		FGT2			Change	
	2007	2013	2016	2007-13	2013-16	2007	2013	2016	2007-13	2013-16
	A	B	C	D	E	F	G	H	I	J
Socio-economic group of household head										
Self-employed with employees	4.3	2.6	3.4	-1.7	0.8	4.9	1.9	2.8	-2.9	0.9
Self-employed without employees (agriculture)	10.3	9.6	8.9	-0.7	-0.7	9.5	9.6	7.8	0.1	-1.8
Self-employed without employees (non-agriculture)	14.4	9.7	9.6	-4.7	-0.1	17.4	9.8	8.8	-7.6	-1.0
Employee (private sector)	16.1	14.4	14.2	-1.7	-0.3	15.8	10.3	9.4	-5.5	-0.9
Employee (public sector)	3.1	1.3	2.6	-1.9	1.3	3.3	0.9	1.6	-2.4	0.7
Unemployed	5.4	29.0	27.5	23.6	-1.5	10.1	38.8	40.5	28.7	1.7
Pensioner	23.0	16.5	12.8	-6.5	-3.7	12.9	9.4	6.7	-3.5	-2.7
Other	23.5	17.0	21.1	-6.5	4.1	26.1	19.2	22.3	-6.9	3.2
Households with/without unemployed										
No unemployed household member	82.6	45.3	44.5	-37.4	-0.7	74.4	35.2	32.6	-39.2	-2.5
At least one unemployed household member	17.4	54.7	55.5	37.4	0.7	25.6	64.8	67.4	39.2	2.5
Age of population member										
Up to 17	18.9	19.3	20.4	0.4	1.2	21.0	20.5	19.7	-0.5	-0.8
18-64	59.5	66.3	65.9	6.8	-0.4	65.8	71.2	71.8	5.4	0.6
65 or over	21.6	14.4	13.6	-7.2	-0.8	13.1	8.3	8.4	-4.9	0.2
Household type										
One person 65- or childless couple (both 65-)	8.7	11.2	10.0	2.5	-1.2	10.2	12.6	12.8	2.4	0.2
One person 65+ or childless couple (both 65+)	15.4	10.0	9.5	-5.4	-0.5	8.8	6.1	5.3	-2.6	-0.8
Other household type no children dependent	18.9	19.8	19.3	0.8	-0.5	18.4	16.9	19.7	-1.5	2.8
Mono-parental household	2.2	3.4	2.8	1.2	-0.6	2.7	5.3	3.2	2.6	-2.1
Couple with 1 or 2 children dependent	31.8	27.1	28.3	-4.7	1.2	36.1	28.0	26.8	-8.1	-1.2
Couple with 3+ dependent children	3.5	7.3	7.8	3.7	0.6	3.4	8.1	8.2	4.6	0.1
Other household type with at least 1 dependent child	19.4	21.2	22.2	1.8	1.0	20.3	22.9	24.0	2.7	1.0
GREECE	100.0	100.0	100.0			100.0	100.0	100.0		

The above findings are further strengthened by the results reported in the second panel of the table showing that the contribution of individuals living in households with at least one unemployed member to aggregate poverty more than tripled during the crisis. The third panel shows that working age individuals increased their contribution to poverty despite their declining population share, while the elderly decreased their own, although their population share rose substantially, as shown in Table 1. All household types apart from the elderly households and households with one/two children increased their contribution to poverty headcount ratio between 2007 and 2013, and, then, the contribution was further increased for households with children up to 2016. Again mono-parental households and households with many children as well as individuals and couples with no elderly adults increased their contribution in both FGT0 and FGT2, especially between the beginning of the observation period and the peak of the crisis.

The graphic illustration of the evolution of the contributions of the different population groups to aggregate poverty using FGT0 and FGT2 during the whole period under consideration (2007-2016) using the "floating" poverty line is presented in the Appendix of the paper in Graphs A3-A6 and A7-A10, respectively. The structure of poverty remains relative stable in the period 2007-2009. Between 2009 and 2010, we observe a large increase in the contribution of households that are either headed by unemployed persons or have unemployed members at the expense of the contributions of households headed by working heads or households without unemployed members. Since 2010 and until the end of the period, the contribution of the former groups gradually increases even more, while that of households headed by pensioners decreases. This is even more clear when FGT2 is used as an index of poverty. As shown in Graphs A4 and A8, the contribution of individuals living in households with at least one unemployed member increases continuously up to 2012 and then remains relatively stable when using either FGT0 or FGT2. A decrease in the contribution of the elderly to total poverty is more evident in the trend graphs after 2011 for both indices (Graphs A5 and A9), with a corresponding increase in the contributions of the working age population members and the children. This result is broadly in line with the trends when the population is grouped according to household type in Graphs A6 and A10.

In Tables 4 and 5, the analysis presented in Tables 2 and 3 is replicated using the "anchored" poverty line instead of the "floating" poverty line of each year. The "anchored" poverty line is calculated keeping constant its 2007 value using the CPI of each year. The poverty rate of all population groups appears to be higher in 2013 in comparison with 2007 by a wide margin. 83.1% of the members of households headed by self-employed without employees in the agricultural sector and 77.8% of the members of households headed by unemployed persons fall below this poverty line (as well as almost 60.0% of the members of the heterogeneous "Other" group). As regards the contributions to aggregate poverty in 2013 using the "anchored" poverty line, members of households headed by pensioners are the main contributors, even though their poverty rate (41.0%) is lower than the national average (48.2%). This should be attributed to the large population share of the group as well as to the fact that almost 30% of the group is located between the "floating" and the "anchored" poverty line in 2013. Between 2013 and 2016, "anchored" poverty decreases substantially for individuals living in households headed by self-

employed without employees in agriculture and pensioners. On the contrary, it increases marginally for individuals living in households headed by public sector employees and "other" (mainly inactive household heads). The relevant changes in contributions to poverty between 2013 and 2016 as depicted in Table 5 show an increase of poverty contribution for members of households headed by private sector employees by almost four percentage points and a decrease of the contribution of unemployed. Given the de-escalation of poverty in this period, a possible explanation is that some of the unemployed poor found a low paid or part-time job and moved to the category of working poor. Turning to the estimates derived using FGT2 in Table 4, between 2007 and 2013, the index more than tripled for all groups. Individuals living in households with unemployed heads and self-employed without employees (agriculture) heads experiences the deepest poverty in 2013. The situation improves slightly for the former group between 2013 and 2016 and substantially for the latter.

The second panel of Table 4 indicates that by 2016, 68.5% of the individuals living in households with at least one unemployed member would be classified as poor using the 2007 poverty line and this corresponds to 44.5% of total poverty according to the estimates of Table 5. When the partitioning criterion is the age of the population member, more than half of the children in 2013, and 47.0% of the working age population and the elderly are classified as poor using the 2007 poverty line. In 2016, the situation is improved mainly for the elderly and the working age population and less for children. The contribution of age-groups to the total poverty, when using the "anchored" poverty line, remains relatively stable reflecting the changes in population shares due to population ageing. When FGT2 is used, one third of the total contribution to poverty shifts from individuals living in households without unemployed members to households with at least one unemployed member between 2007 and 2013. The share remains stable between 2013 and 2016 (Table 5). The findings for the age groups are consistent with the findings when using FGT0.

What is interesting when partitioning the population by household type is the large increase in poverty when using both FGT0 and FGT2 for the category "other household type without dependent children". This household type mainly includes families with adult children aged 18-30 that still leave with their parents. This result is due to the high unemployment rate that this age-group faces that skyrocketed for those aged 18-24 to almost 60% at the peak of the crisis. As far as the changes to the contribution are concerned, as shown in Table 5, the increase is larger for households with more than three dependent children.

The evolution for the whole period 2007-2016 of the contributions of different populations groups to total poverty using the "anchored" poverty are depicted in Graphs A11-A14 and A15-A18 in the Appendix. In line with the rest of the graphs in the Appendix, when "floating poverty lines are employed", there is an increasing contribution for the groups that are related to unemployment ("households headed by unemployed persons" and "households with unemployed members") up to 2011 and then it is kept stable at high levels. The result is more striking when using FGT2. On the other hand, the contribution of households headed by pensioners remains relatively more stable through time when using the anchored poverty line than when floating lines are utilized.

Table 4. Structure and inter-temporal change in poverty: 2007, 2013 and 2016 (anchored poverty lines)

Population Group	Poverty rate (FGT0)			Change (%)		FGT2			Change (%)	
	2007	2013	2016	2007-13	2013-16	2007	2013	2016	2007-13	2013-16
	A	B	C	D	E	F	G	H	I	J
Socio-economic group of household head										
Self-employed with employees	16.5	35.9	35.2	118.6	-2.0	2.14	6.44	6.59	203.6	2.3
Self-employed without employees (agriculture)	40.0	83.1	56.8	108.5	-31.9	4.25	19.56	12.37	364.0	-37.1
Self-employed without employees (non-agriculture)	29.4	45.8	48.2	56.4	5.4	4.08	10.39	9.06	156.1	-12.9
Employee (private sector)	14.8	39.9	39.8	170.9	-0.1	1.66	7.34	5.34	346.3	-27.6
Employee (public sector)	4.1	20.0	20.5	395.7	2.4	0.50	1.57	1.76	219.6	12.2
Unemployed	32.1	77.8	76.9	143.9	-1.1	6.96	23.14	22.13	234.8	-4.4
Pensioner	18.5	41.0	35.3	122.6	-14.1	1.20	4.78	3.44	301.8	-28.3
Other	30.4	64.2	64.3	112.3	0.2	3.87	14.04	12.93	265.8	-8.0
Households with/without unemployed										
No unemployed household member	18.6	38.8	35.3	109.8	-9.2	1.92	6.17	4.68	223.8	-24.4
At least one unemployed household member	28.9	66.9	68.5	132.4	2.5	4.90	16.40	15.84	237.3	-3.5
Age of population member										
Up to 17	22.7	53.1	51.6	135.7	-2.8	2.89	11.55	9.67	302.0	-16.4
18-64	18.3	47.3	44.9	160.0	-5.3	2.32	10.42	8.74	352.0	-16.3
65 or over	22.5	47.0	40.5	110.0	-13.8	1.57	5.70	4.50	266.9	-21.2
Household type										
One person 65- or childless couple (both 65-)	16.6	37.8	36.5	129.6	-3.6	2.22	8.79	7.62	298.4	-13.5
One person 65+ or childless couple (both 65+)	23.8	47.5	41.5	100.5	-12.7	1.56	5.49	4.28	255.8	-22.3
Other household type no children dependent	13.9	43.0	39.5	212.6	-8.2	1.55	8.22	6.81	435.7	-17.3
Mono-parental household	25.8	65.8	60.6	156.8	-8.0	3.59	18.03	11.76	406.1	-35.1
Couple with 1 or 2 children dependent	19.9	46.9	45.5	137.2	-3.1	2.59	9.47	8.27	268.2	-12.7
Couple with 3+ dependent children	30.6	58.9	57.5	93.6	-2.4	3.41	15.81	11.85	366.9	-25.3
Other household type with at least 1 dependent child	27.6	61.9	55.8	125.5	-10.0	3.30	13.91	11.33	323.0	-18.7
GREECE	19.8	48.2	45.0	144.6	-6.7	2.27	9.60	7.94	325.5	-17.4

Table 5. Contributions to aggregate poverty: 2007, 2013 and 2016 (anchored poverty lines)

Population Group	Poverty rate (FGT0)			Change		FGT2			Change	
	2007	2013	2016	2007-13	2013-16	2007	2013	2016	2007-13	2013-16
	A	B	C	D	E	F	G	H	I	J
Socio-economic group of household head										
Self-employed with employees	4.3	2.8	2.8	-1.5	0.0	4.9	2.5	3.0	-2.3	0.5
Self-employed without employees (agriculture)	10.3	8.0	6.5	-2.3	-1.5	9.5	9.5	8.0	0.0	-1.5
Self-employed without employees (non-agriculture)	14.4	8.6	8.5	-5.8	-0.1	17.4	9.8	9.1	-7.6	-0.7
Employee (private sector)	16.1	13.9	17.6	-2.2	3.7	15.8	12.9	13.4	-2.9	0.5
Employee (public sector)	3.1	4.7	5.2	1.5	0.6	3.3	1.8	2.5	-1.5	0.7
Unemployed	5.4	20.9	18.9	15.5	-2.0	10.1	31.2	30.9	21.1	-0.3
Pensioner	23.0	25.1	21.9	2.2	-3.2	12.9	14.7	12.1	1.8	-2.6
Other	23.5	16.0	18.5	-7.5	2.5	26.1	17.6	21.1	-8.5	3.5
Households with/without unemployed										
No unemployed household member	82.6	53.5	55.5	-29.1	2.0	74.4	42.7	41.7	-31.6	-1.0
At least one unemployed household member	17.4	46.5	44.5	29.1	-2.0	25.6	57.3	58.3	31.6	1.0
Age of population member										
Up to 17	18.9	18.2	18.9	-0.6	0.6	21.0	19.9	20.0	-1.1	0.1
18-64	59.5	61.0	61.0	1.5	0.0	65.8	67.4	67.3	1.6	-0.1
65 or over	21.6	20.8	20.2	-0.8	-0.6	13.1	12.7	12.7	-0.5	0.0
Household type										
One person 65- or childless couple (both 65-)	8.7	9.8	9.2	1.1	-0.6	10.2	11.4	10.9	1.2	-0.5
One person 65+ or childless couple (both 65+)	15.4	15.9	15.2	0.6	-0.7	8.8	9.3	8.9	0.5	-0.4
Other household type no children dependent	18.9	19.0	20.0	0.1	1.0	18.4	18.2	19.5	-0.2	1.3
Mono-parental household	2.2	2.9	2.6	0.7	-0.3	2.8	4.0	2.9	1.2	-1.1
Couple with 1 or 2 children dependent	31.8	27.8	26.7	-4.0	-1.1	36.1	28.1	27.5	-8.0	-0.7
Couple with 3+ dependent children	3.5	5.3	6.8	1.8	1.5	3.4	7.2	7.9	3.8	0.7
Other household type with at least 1 dependent child	19.4	19.3	19.5	-0.2	0.2	20.2	21.7	22.4	1.5	0.6
GREECE	100.0	100.0	100.0			100.0	100.0	100.0		

In the next step, we present a decomposition of the trend in aggregate poverty. In other words, we quantify to what extent the reported changes in aggregate poverty can be attributed (a) to changes in the population shares of the various population groups and (b) to changes in the values of the poverty indices of the corresponding groups – essentially, a "shift shares" type of analysis (Tsakloglou, 1990). The results are reported in Table 6 and depend crucially on the selection of both the type of the poverty line and the poverty index.

In the top three panels of the table, "floating" poverty lines are used. FGT0 increased by 2.18 percentage points in the first sub-period and declined by 2.23 percentage points in the second sub-period; the overall change was almost nil. On the contrary, due to the fact that the relative income position of several members of the population below the poverty line deteriorated – sometimes dramatically – FGT2 records a substantial increase between 2007 and 2013 that is only marginally offset between 2013 and 2016. According to the decomposition of the FGT0 trend, when the population is partitioned according to the socioeconomic group of the household head, in the first sub-period almost the entire change can be attributed to changes in population shares. In other words, there was a shift of the population from low-poverty to high-poverty groups (mainly from households with employed heads to household with unemployed heads). The reversal in the second sub-period is attributed primarily to the reduction in poverty within population groups (over four fifths of the overall change; that is, 1.85/2.23). However, when FGT2 is used instead of the poverty rate (FGT0), the main mover seems to be the change within population groups in both periods. A relatively similar pattern is also observed when the population is partitioned according to the presence of unemployed members in the household. Changes in population shares were strongly poverty-enhancing in the overall period under examination irrespective of the index used, whereas changes in poverty within population groups played a positive role according to FGT0 but a negative one according to FGT2.

When the population is partitioned according to the age of the population member the changes in the population shares are, naturally, pretty small and, as a consequence, in most cases the main mover is the change in poverty within particular age groups. For example, for the entire period, the value of FGT2 rose by 1.02 (45.4% vis-à-vis the value of the index in 2007, according to the estimates reported in Table 2). Ceteris paribus, if the age structure of the population had remained unchanged between 2007 and 2016 but poverty as measured by the FGT2 within groups had changed in the way it did, the value of the index would have increased by 1.08 (in other words, 105.9% of the change in the value of FGT2 can be attributed to this change). Ceteris paribus, if the structure of the population changed in the way it did but poverty within each age groups had remained unchanged, the value of the FGT2 would have declined by -0.06 (in other words this change in population shares accounts for -5.9% of the observed change in the value of FGT2, or -2.7% of the value of the index in 2007; that is 45.4*(-0.059)). Finally, when the population is grouped according to household type, the effect of change in population shares counterbalances the effect of change in poverty within

groups for FGT0. Yet, for FGT2 the effect of the within group poverty changes is substantially larger.

Table 6. Decomposition of changes in aggregate poverty

Characteristic of HH head or HH member	Period	Poverty rate (FGT0)			FGT2		
		Overall change	Change due to changes in population shares	Change due to changes in poverty within groups	Overall change	Change due to changes in population shares	Change due to changes in poverty within groups
Floating poverty line							
Socio-economic group of household head	2007-2013	2.18	2.15	0.03	1.66	0.60	1.06
	2013-2016	-2.23	-0.38	-1.85	-0.64	-0.14	-0.50
	2007-2016	-0.05	1.74	-1.79	1.02	0.51	0.51
Households with/without unemployed	2007-2013	2.18	3.38	-1.20	1.66	0.92	0.74
	2013-2016	-2.23	-0.99	-1.25	-0.64	-0.25	-0.39
	2007-2016	-0.05	3.07	-3.12	1.02	0.78	0.24
Age of population member	2007-2013	2.18	-0.05	2.23	1.66	-0.04	1.70
	2013-2016	-2.23	-0.10	-2.14	-0.64	-0.03	-0.61
	2007-2016	-0.05	-0.09	0.04	1.02	-0.06	1.08
Household type	2007-2013	2.18	0.50	1.68	1.66	0.07	1.59
	2013-2016	-2.23	0.11	-2.34	-0.64	0.01	-0.65
	2007-2016	-0.05	0.51	-0.56	1.02	0.04	0.99
Anchored poverty line							
Socio-economic group of household head	2007-2013	28.39	2.54	25.85	7.33	0.89	6.44
	2013-2016	-3.22	-0.43	-2.79	-1.66	-0.21	-1.45
	2007-2016	25.17	2.02	23.14	5.67	0.73	4.94
Households with/without unemployed	2007-2013	28.39	4.15	24.24	7.33	1.43	5.90
	2013-2016	-3.22	-1.31	-1.91	-1.66	-0.46	-1.20
	2007-2016	25.17	3.78	21.39	5.67	1.23	4.44
Age of population member	2007-2013	28.39	0.05	28.34	7.33	-0.06	7.39
	2013-2016	-3.22	-0.03	-3.19	-1.66	-0.05	-1.61
	2007-2016	25.17	-0.01	25.17	5.67	-0.08	5.75
Household type	2007-2013	28.39	0.64	27.74	7.33	0.09	7.23
	2013-2016	-3.22	0.19	-3.41	-1.66	0.04	-1.69
	2007-2016	25.17	0.72	24.44	5.67	0.06	5.61

On the contrary, in the four lower panels of the table where “anchored” poverty lines are used, irrespective of the poverty index, in all period, the main mover was changes in poverty within population groups. This is not surprising taking into consideration the large increases in poverty within groups reported in Table 4. Looking at the overall period under consideration (2007-2016), other things being equal, changes in the structure of the population appear to increase poverty when the population is partitioned according to the socio-economic group of the household head, presence of unemployed members in the household as well as household type and to reduce it marginally when the population is partitioned according to the age of the population member.

4. Conclusions

The paper examined developments in the level and structure of poverty in Greece during the recent crisis, using the information of the Greek SILC dataset. During the period under examination, 2007-2016, there was a severe decline in the real disposable income of all population groups irrespective of the partitioning criterion utilized. Yet, the relative position of particular groups in the income distribution changed considerably during the crisis. Naturally, this has implications for the evolution of the structure of poverty.

Relative poverty, measured using “floating” poverty lines, recorded an increase that appears to be quite substantial when distribution-sensitive poverty indices are utilized. Taking into account that, peak to bottom, disposable income declined by almost 42% in the period under examination, it is not surprising to find that poverty using the “anchored” poverty line at pre-crisis level shot up.

The enormous increase in unemployment that reached 27.5% at the peak of the crisis was the main driving force for the recorded changes in the structure of poverty. On the contrary, despite the decline in their income in absolute terms during the crisis due to cumulative cuts in both main and supplementary pensions, the pensioners improved considerably their relative position and, thus, their contribution to aggregate poverty declined substantially. Moreover, despite the introduction of income-related family benefits in 2013, at the peak of the crisis, children remain the most vulnerable age group and particularly those living in families with 3 or more children as well as mono-parental families. This is mainly due to the fact that many of them live in households with low work intensity.

Greece’s social model can explain to a considerable extent these results. Until recently, Greece was arguably the most typical case of “Mediterranean male-breadwinner welfare state” in the “old” EU member-states. According to the OECD, before the crisis Greece’s labour market lacked flexibility. Youth and female unemployment rates were the highest in the EU. Yet, the fact that at least one family member – usually, the male breadwinner – had a formal attachment to the labour market, acted protectively against poverty. The intra-household allocation of resources was in favor of children and, to a lesser extent, inter-

household monetary and non-monetary transfers across members of the "extended family" acted as an informal safety net that absorbed shocks to household income.

Even though social spending as a share of GDP rose sharply in the years before the crisis, it was directed mainly to social insurance (overwhelmingly, pensions) and not social assistance. Mainly, due to lucrative early retirement schemes for several groups of pensioners combined with generous minimum pensions, many pensions were of low level, but actuarially over-compensating. The redistributive effects of welfare spending in reducing poverty and inequality were small in comparison to other EU countries and Greece's levels of poverty were among the highest in the EU, mainly due to lack of means-tested benefits. Both the level of social assistance and the effectiveness of targeting the poor were low. Greece was a typical member of the Southern European Model as defined by Ferrera (1996), where resources aimed to alleviate poverty were limited and fragmented while the country lacked a universal means-tested benefit.

When the crisis erupted, Greek households were found without an appropriate social safety net. Unemployment insurance was flat, inadequate and provided for a limited period of time, while there was very limited protection for a small number of long-term unemployed, their share skyrocketing to over 75% of the total unemployment during the crisis. Additionally, Greece was one of the last countries in the EU without, a minimum income guarantee scheme. Many household heads lost their jobs and a considerable proportion of the population was left with very limited financial resources; the "male breadwinner model" collapsed. To a large extend, this explains the sharp increase in the contributions of groups of households with unemployed members to aggregate poverty, especially when indices sensitive to the existence of very low incomes are utilized.

The pensioners were practically the only segment of the population with a minimum income guarantee in place during the crisis. The combination of minimum pensions, a basic pension covering elderly with contributions insufficient to qualify for a minimum pension and a social solidarity supplement for low-income pensioners (EKAS) prevented the great majority of the elderly from extreme poverty. This is the reason that even though before the crisis the poverty rate of the pensioner households was marginally lower than the national average, when the distribution-sensitive FGT2 index is used, the estimate for the group was only 55% of the national average. During the crisis there were consecutive cuts in pensions. However, unlike what is often heard in the public discourse in Greece, these cuts were on average far lower than the decline in mean incomes and were not uniform. The low pensions, even the non-contributory, were protected to a considerable extent, while those at the top of the pension distribution experienced severe cuts.

As already mentioned, a number of specific measures taken during the crisis as part of the three economic adjustment programs, profoundly affected the distribution of income and poverty. The strict fiscal consolidation pursued was significantly frontloaded and almost evenly spread between expenditure cuts (54.9%) and revenue increases (45.1%) over the 2010-2017 period. Total measures taken were close to 69 billion euros, i.e. at 30.6% of the

2010 GDP.[14] In many cases, the policies were adopted without proper examination of their likely distributional effects. For instance, four major changes in the personal income taxation took place in 2010, 2011, 2013 and 2016. The first two of them increased marginal tax rates and introduced solidarity taxes that did not affect directly the majority of the poor. However, using micro-simulation techniques, Leventi and Picos (2019), estimate that by abolishing the zero-tax bracket and introducing a tax credit for employment and pension incomes, the 2013 reform caused a 3% decrease in the disposable income of the poorest decile. The 2016 reform only slightly mitigated this result, by increasing the disposable income of the first decile by a mere 0.5%. Likewise, the introduction of recurrent property taxation in 2011, along with subsequent increases in 2013 and 2015 led to a regressive outcome (Andriopoulou et al., 2020).

In the early years of the program (2010-2012), there were substantial cuts in public sector wages and pensions in order to reduce public expenditures. These cuts resulted in declines in aggregate demand that contributed to the sharp rise in unemployment, while private sector wages declined only marginally. It took a 22% cut on the minimum wage (32% for the youth) in 2012 in order to reverse the upward trend in unemployment. As noted in the paper, the increase in unemployment was the main driver of poverty increases. A series of targeted benefits were introduced in 2013-2014. They were well designed, but not substantial for the size of the problem. In 2013, the unemployment insurance benefit was extended to cover the self-employed, while the long-term unemployment assistance benefit that until then was granted only to persons aged over 45 was expanded to cover younger long-term unemployed workers. A unified mean-tested child benefit was established in 2013, replacing income tax allowances for children that benefited only the top half of the income distribution that was paying income taxes; a change that led to a decline in child poverty. The main driver of the small decline in poverty in 2014 was the provision of a means-tested "social dividend" disbursed at the end of the year since fiscal targets were overshot (EUROMOD, 2016). Yet, due to the worsening condition in the Greek economy in 2015 and the imposition of capital controls, the provision of a "social dividend" was discontinued in 2015. Policy changes in 2016 had a progressive effect on the income distribution mainly driven by the two means-tested benefits (food stamps and housing allowance) that were introduced in 2015. Further, the tax reform that took place in 2016 changing the income brackets and tax rates of the personal income tax schedule had a positive effect on the incomes of the poorest income deciles. On the other hand, changes in social insurance contributions, mainly for the self-employed had a regressive impact (EUROMOD, 2017). Arguably, the most important policy change related to poverty alleviation during the years of the crisis was the introduction of system of Minimum Income Guarantee, first as a pilot project (2014-2016) and, then, as a full-blown program from 2017 onwards (i.e. outside the period covered in the paper).[15]

[14] Naturally, this figure is substantially higher if as basis is taken the peak of the crisis.

[15] For an analysis of changes in social assistance in the years of the Economic Adjustment Programs see Matsaganis (2020).

All in all, the Greek experience demonstrates clearly the importance of effective safety nets for poverty alleviation. However, as became abundantly clear by the results of our analysis, the main factor that is likely to contribute to a drastic decline in poverty in Greece, especially when “anchored” poverty lines are utilized, is the return to robust growth rates and a sharp decline in unemployment rate.

The findings of the paper are likely to have policy implications that go beyond Greece, to other countries - mainly but not exclusively developing - embarking on fiscal stabilization programs after a crisis. Crises are periods when needs rise and resources decline. Due to lack of resources, it is immensely difficult to introduce serious programs protecting the most vulnerable members of the population during a crisis. Therefore, the corresponding programs should be in place during the “good” times. However, usually such times are associated with complacency. Moreover, the results of the paper show that the sharp increase in poverty in Greece during the crisis was associated primarily with the explosion of unemployment. Help to the unemployed should not be directed exclusively through income-support benefits. It is of paramount importance that the unemployed do not lose their skills through long-term unemployment spells. If they lose their skills, when the economy recovers, they are likely to find low-paid jobs that may not be sufficient to push them above the poverty line. Therefore, efficient policies promoting employment and skill formation (for example through social security subsidies, short-term public or social work programs or training) should also be in place along with targeted income support programs during periods of fiscal stabilization.

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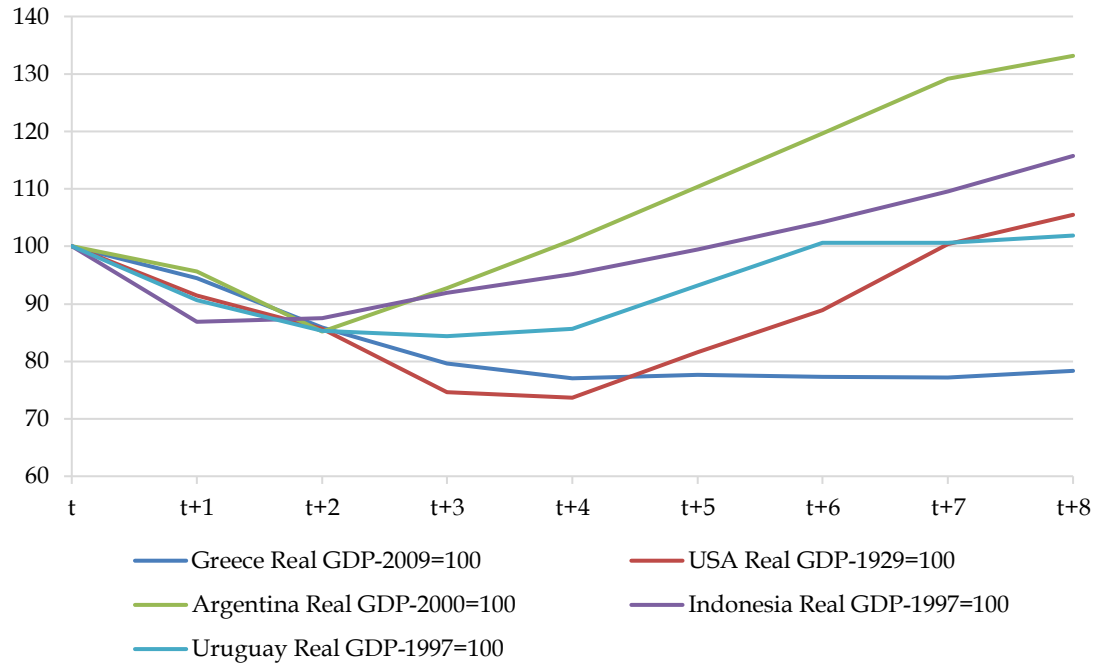
APPENDIX

Table A1: Sample truncation and its effects on the poverty rate

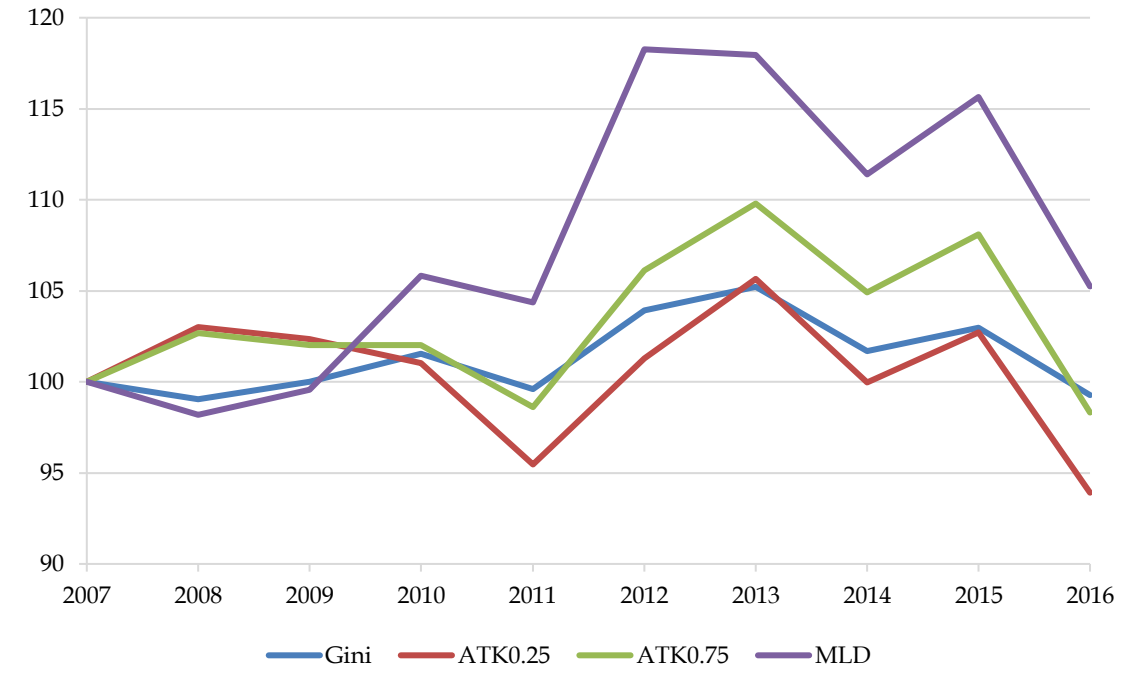
Year	Number of individuals in the sample	Share of individuals with incomes less than 1% of equivalized mean (%)	Share of individuals with incomes higher than 10 times the equivalized mean (%)	Poverty rate (truncated sample)	Poverty rate (full sample)	Absolute difference
2007	16,869	0.79	0.05	19.83	20.38	-0.55
2008	18,035	1.04	0.03	19.73	20.17	-0.44
2009	17,611	0.69	0.01	19.88	20.31	-0.43
2010	15,067	0.99	0.02	20.69	21.20	-0.51
2011	13,869	1.62	0.02	22.26	22.82	-0.56
2012	18,030	0.79	0.05	22.83	23.13	-0.30
2013	20,995	0.16	0.05	22.01	22.09	-0.08
2014	34,465	0.98	0.06	21.05	21.59	-0.54
2015	44,094	0.96	0.04	20.91	21.38	-0.47
2016	54,041	1.00	0.08	19.78	20.25	-0.47

Graph A1: Comparing the Greek crisis with other major economic crises



Source: Hellenic Council of Economic Advisors using FRED and ELSTAT.

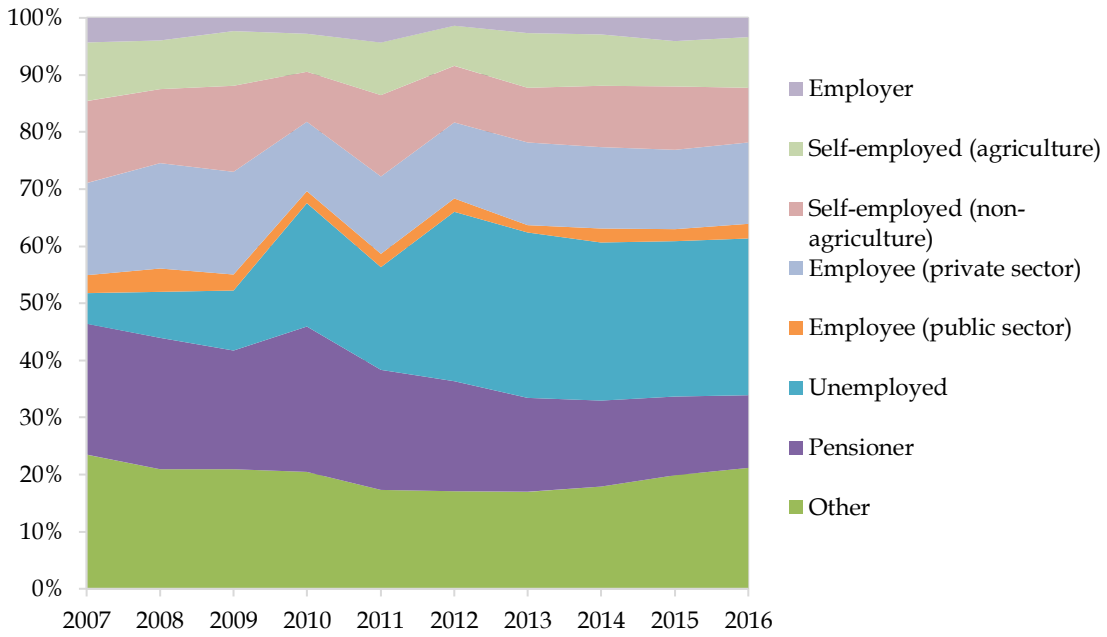
Graph A2: Intertemporal changes in inequality indices (2007-2016)



Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

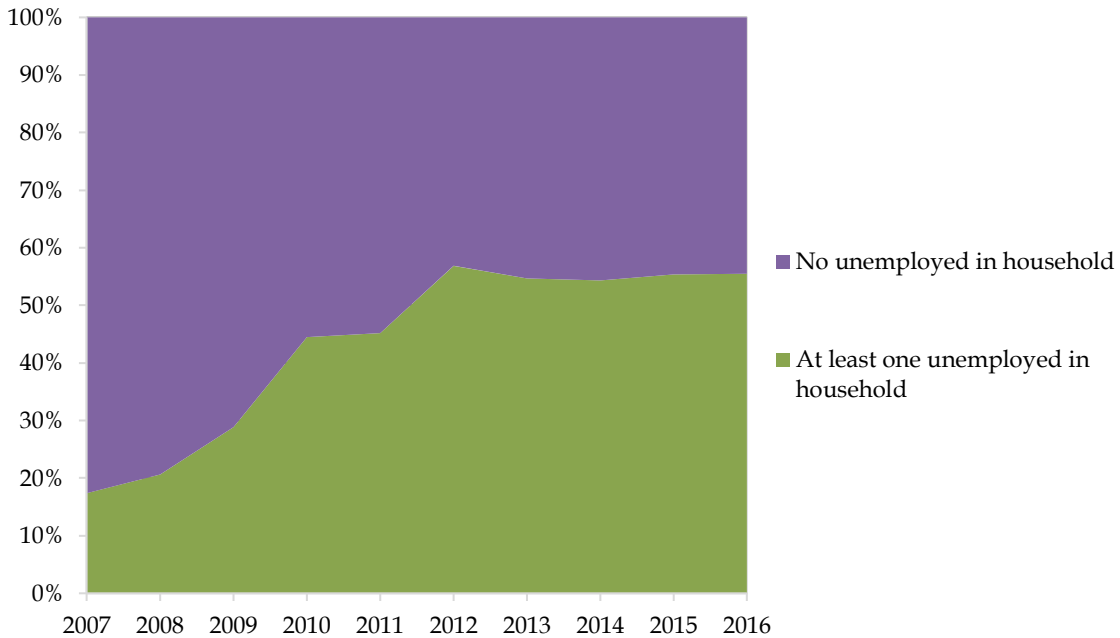
Contributions to aggregate poverty

Graph A3. Population partitioned according to the socio-economic group of the household head - FGT0, "floating" poverty line



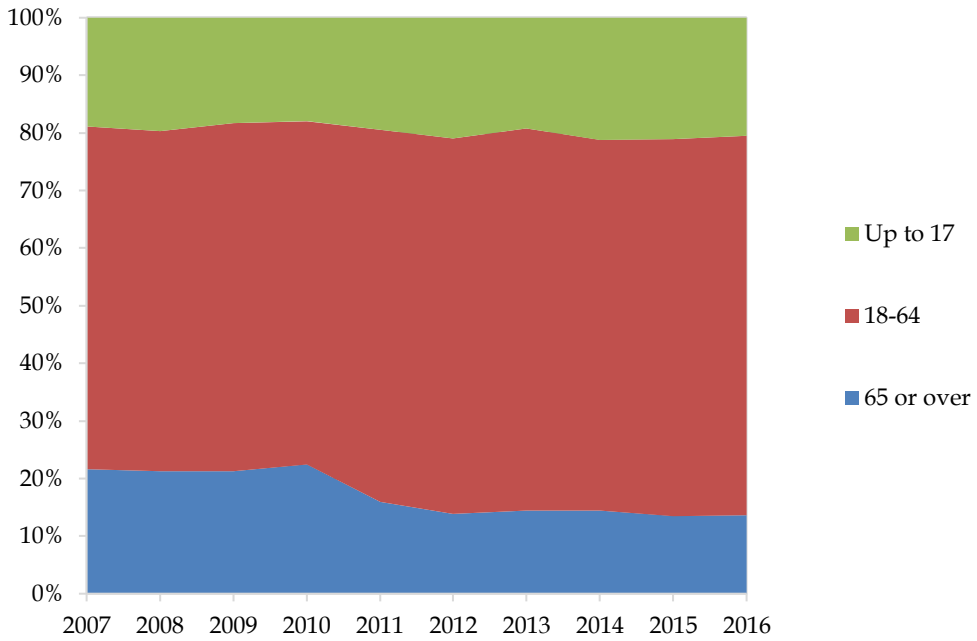
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A4. Partition according to the number of unemployed household members - FGT0, "floating" poverty line



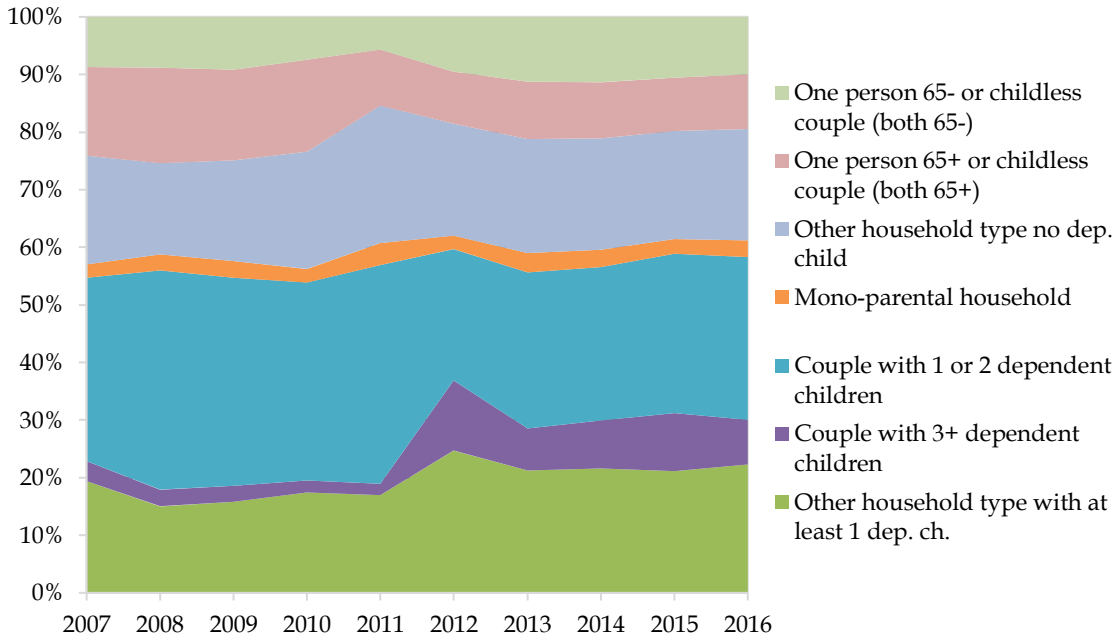
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A5. Partition according to the age of population member - FGT0, "floating" poverty line



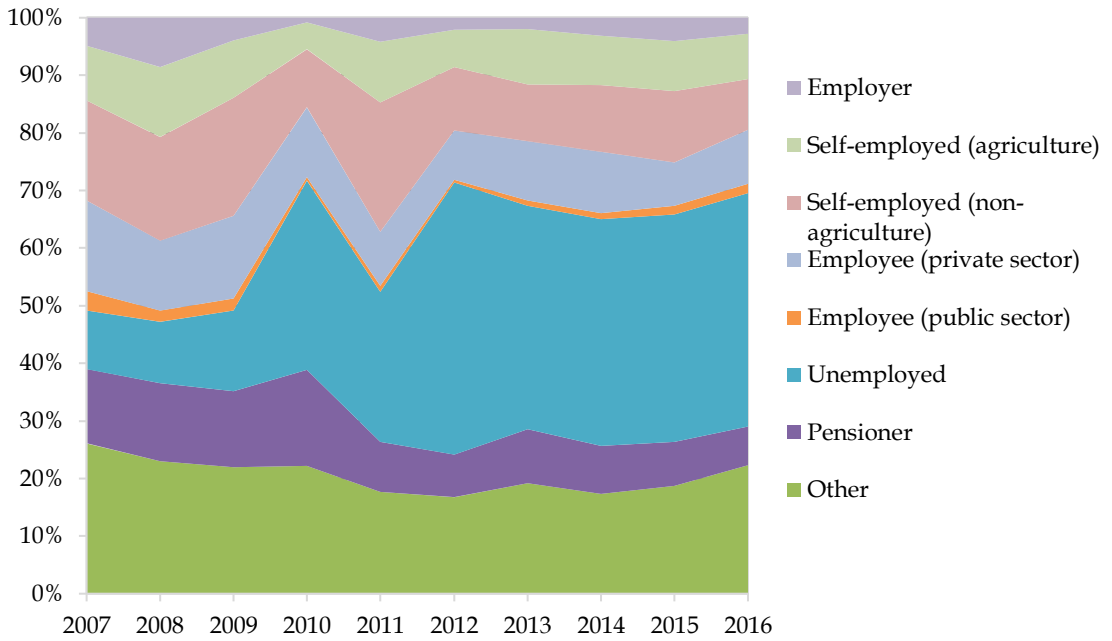
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A6. Partition according to the Household type - FGT0, "floating" poverty line



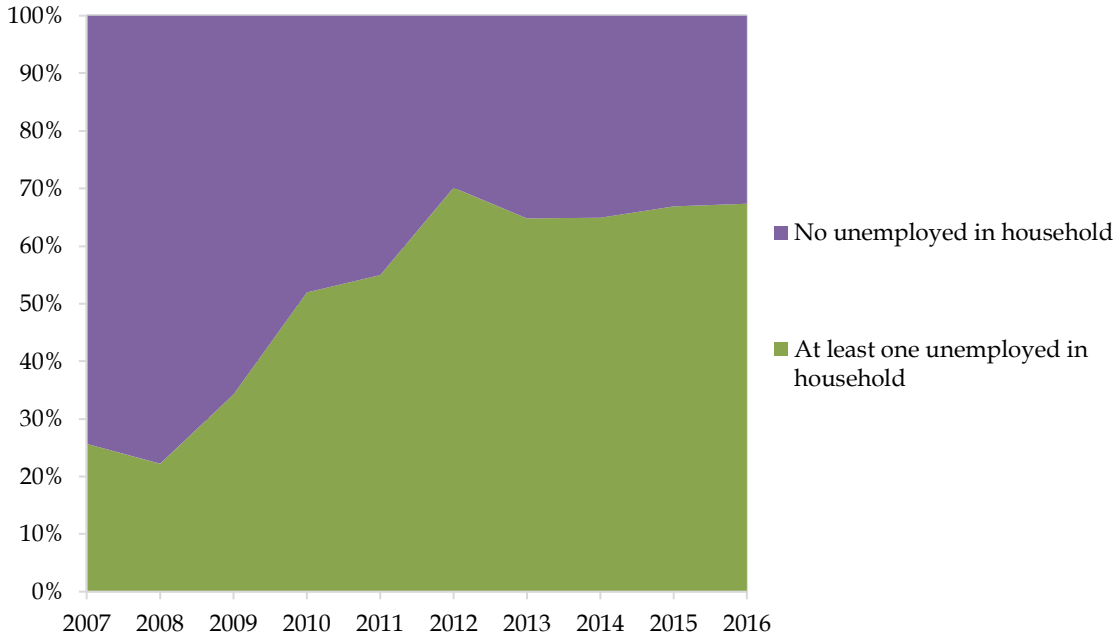
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A7. Population partitioned according to the socio-economic group of the household head - FGT2, "floating" poverty line



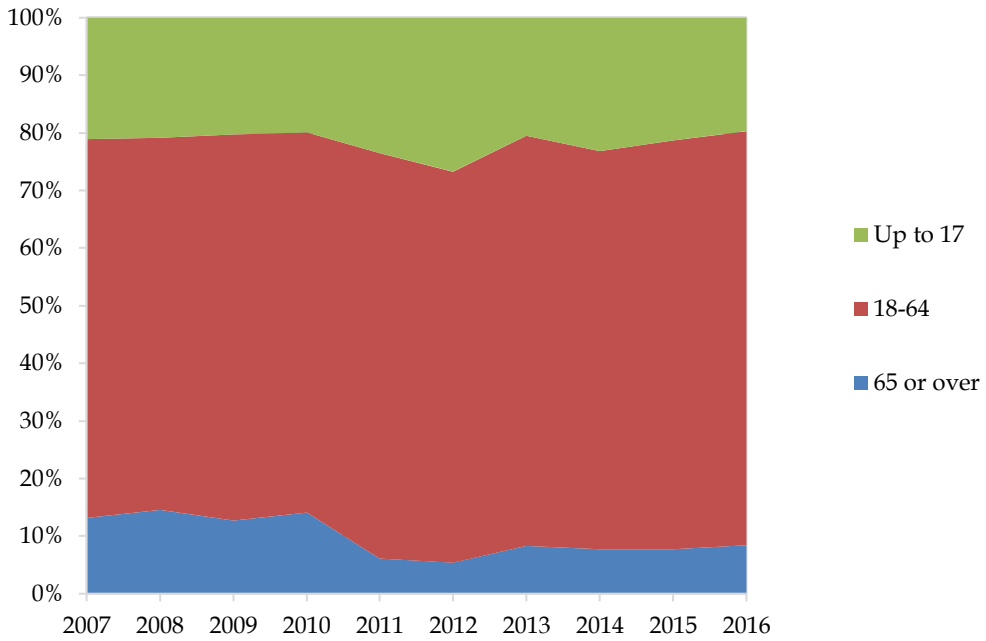
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A8. Partition according to the number of unemployed household members - FGT2, "floating" poverty line



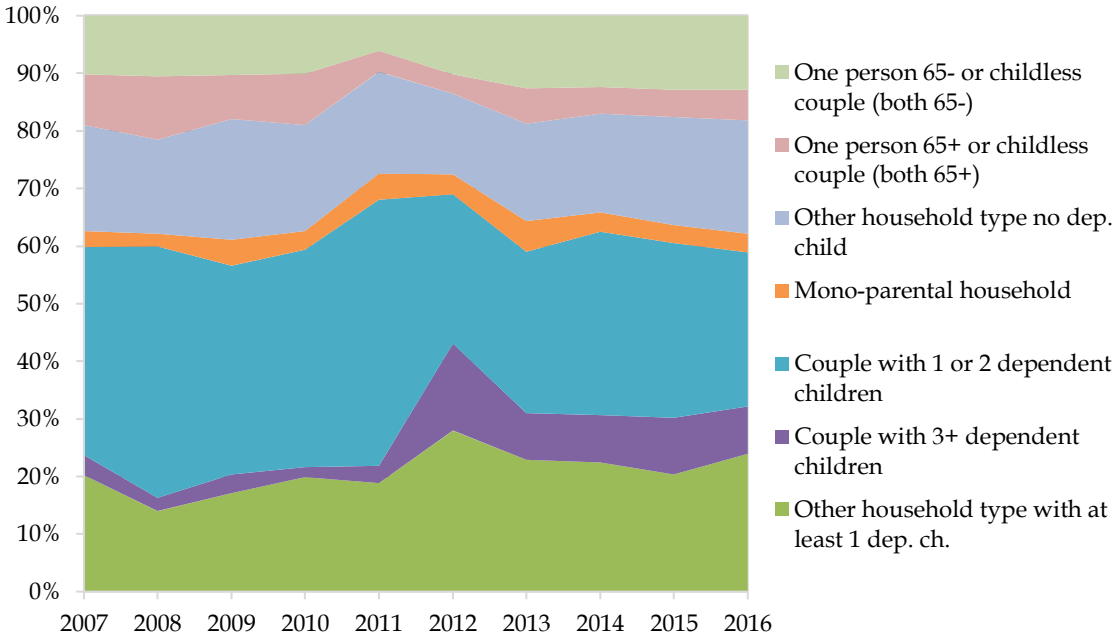
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A9. Partition according to the age of the population member - FGT2, "floating" poverty line



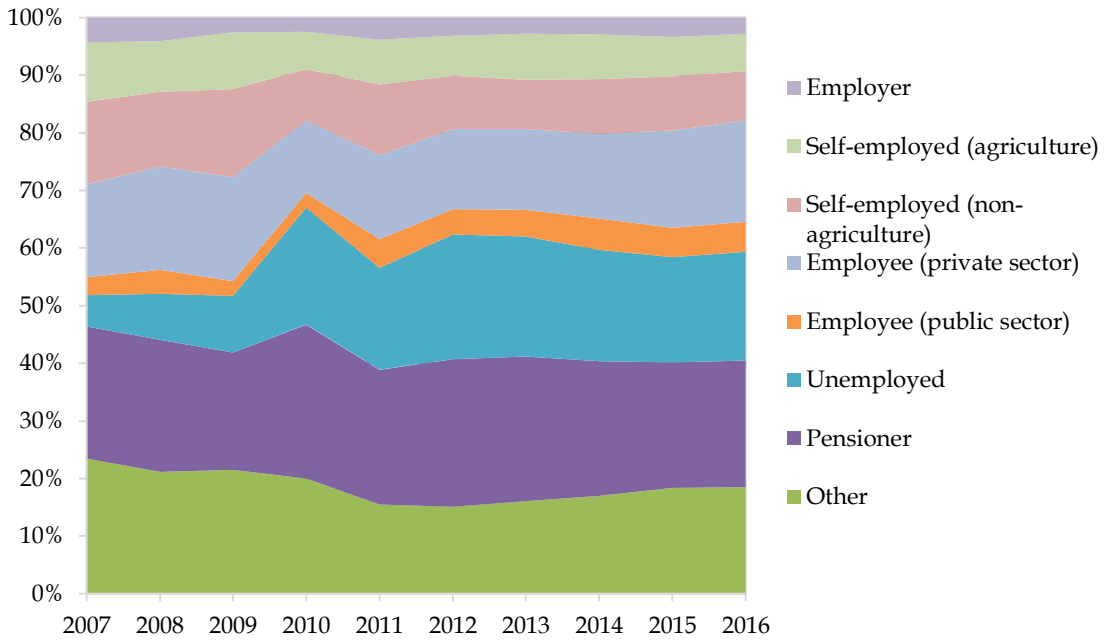
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A10. Partitioned according to the Household type -FGT2, "floating" poverty line



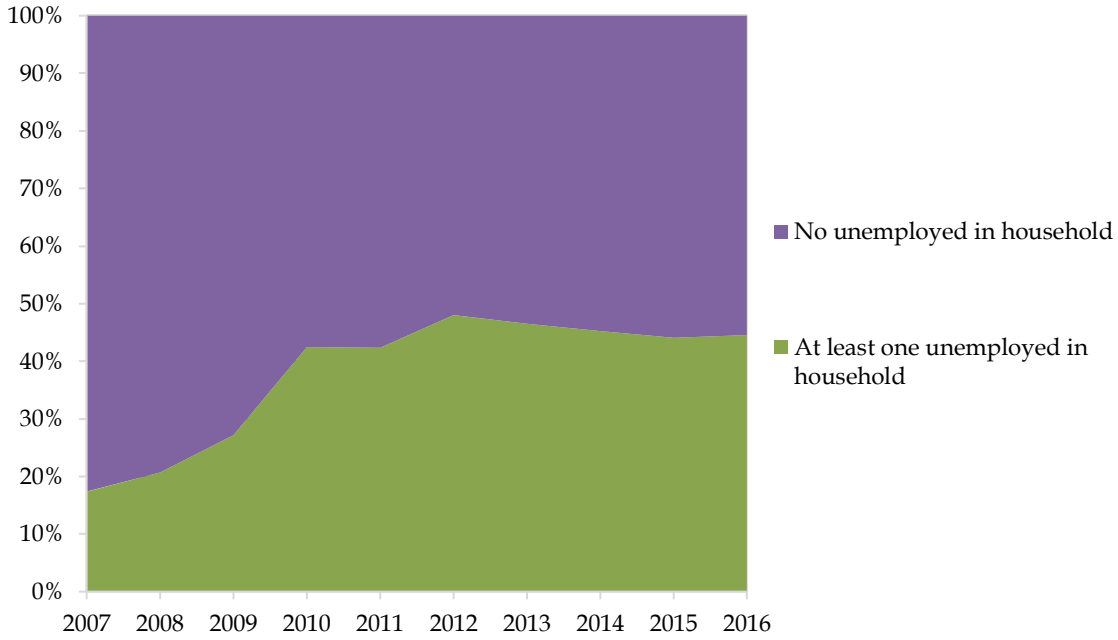
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A11. Population partitioned according to the socio-economic group of the household Head – FGT0, "anchored" poverty line



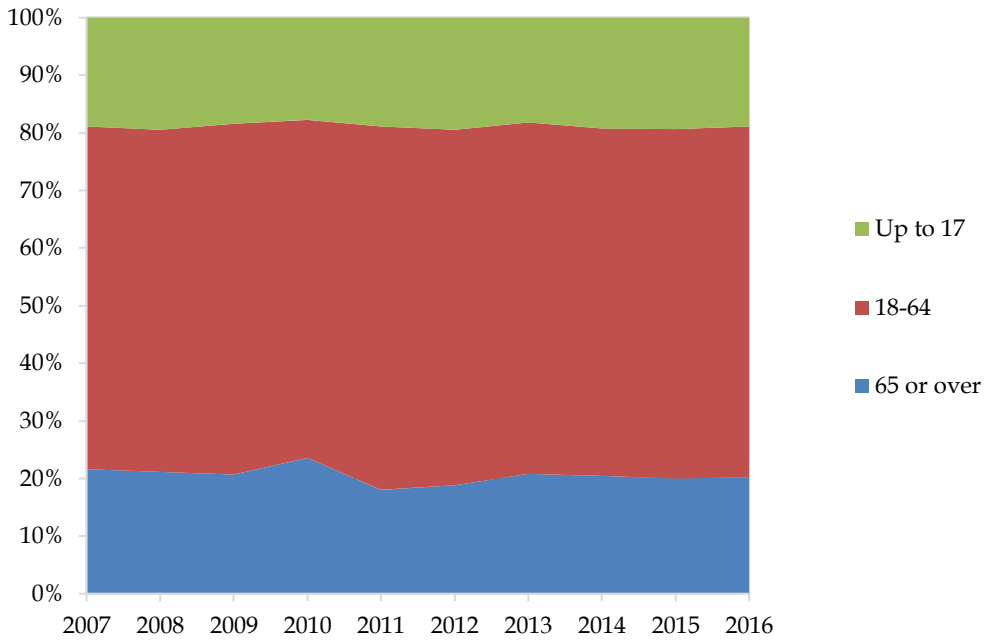
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A12. Partition according to the number of unemployed household members – FGT0, "anchored" poverty line



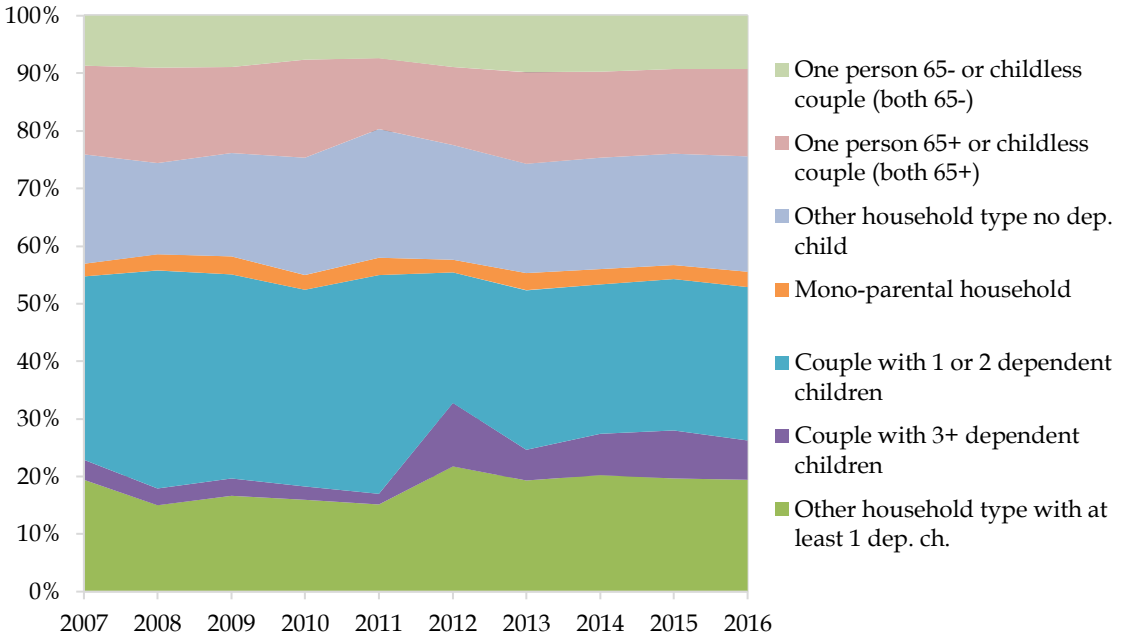
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A13. Partition according to the age of the population member - FGT0, "anchored" poverty line



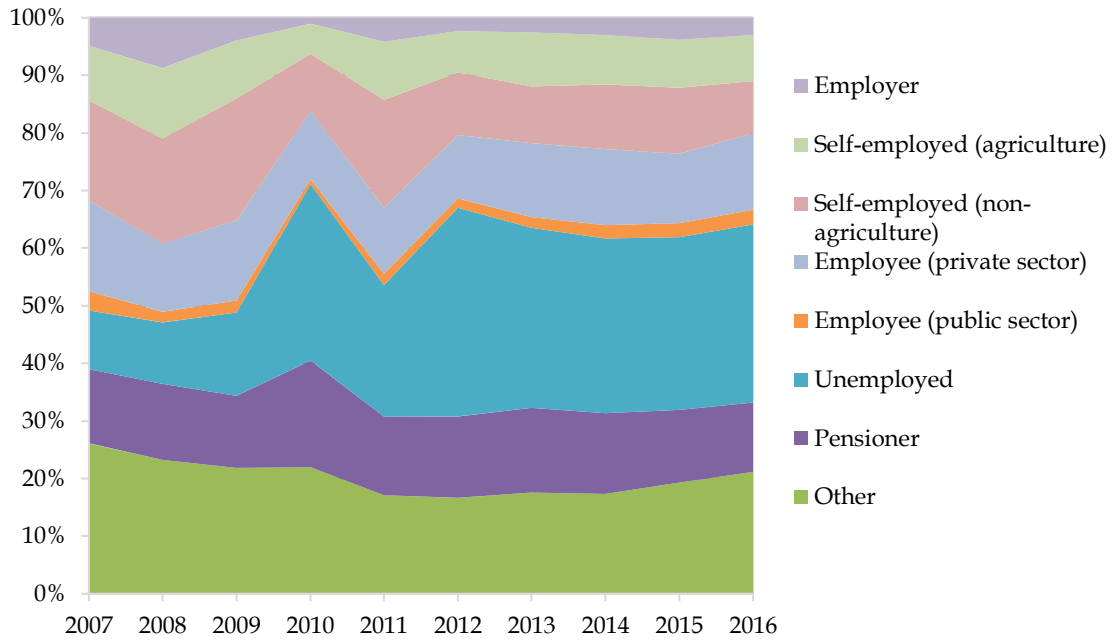
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A14. Partitioned according to the Household type - FGT0, "anchored" poverty line



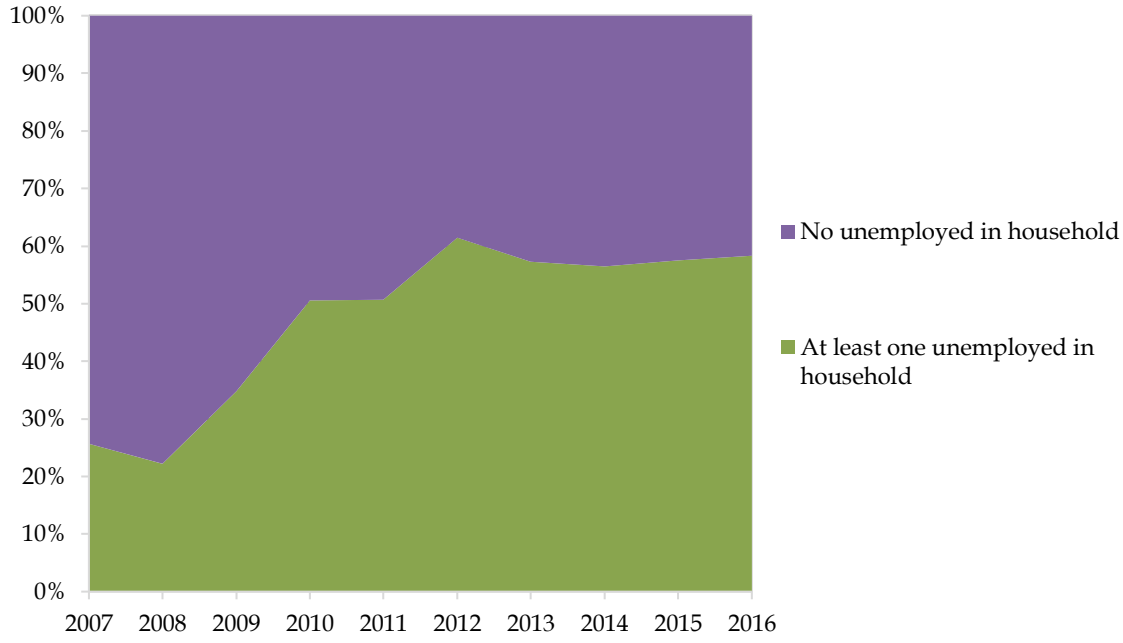
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A15. Population partitioned according to the socio-economic group of the household head – FGT2, "anchored" poverty line



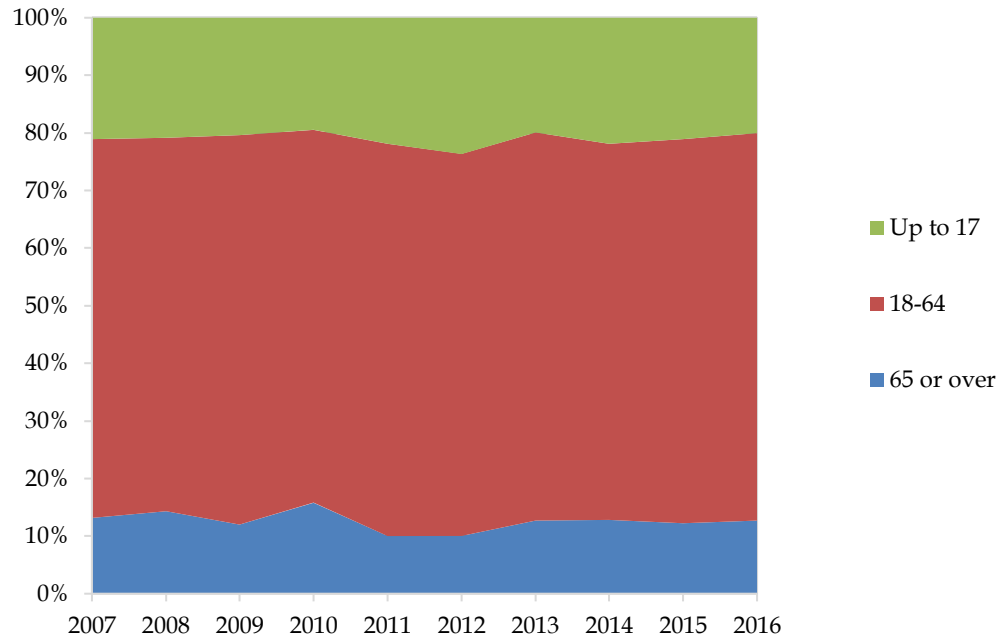
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A16. Partition according to the number of unemployed household members – FGT2, "anchored" poverty line



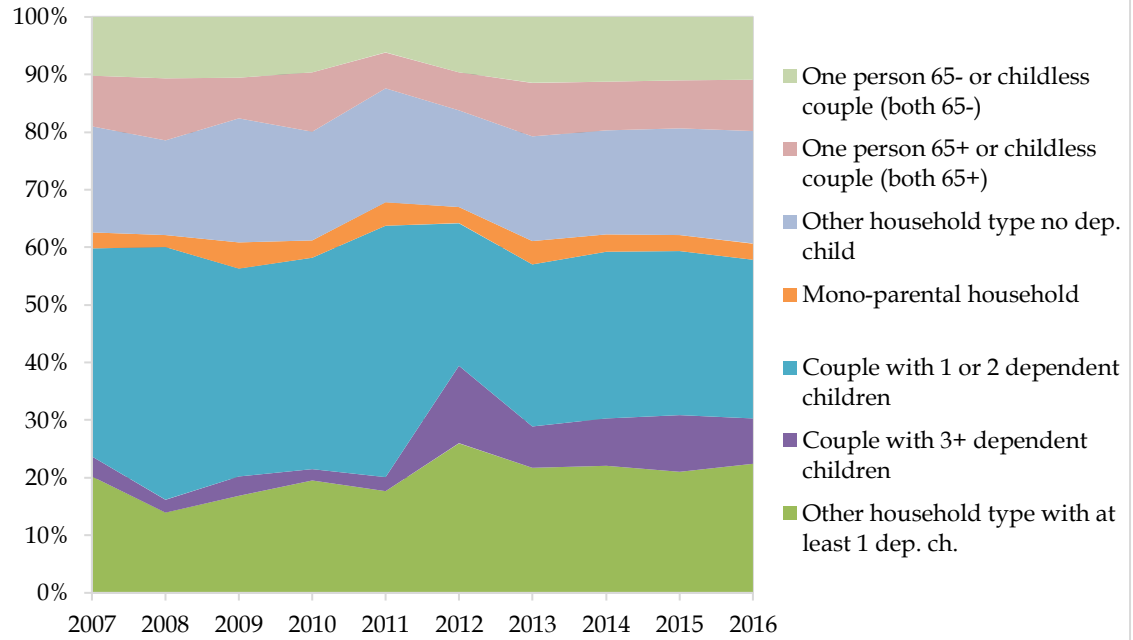
Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A17. Partition according to the age of the population member - FGT2, "anchored" poverty line



Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

Graph A18. Partitioned according to the Household type - FGT2, "anchored" poverty line



Source: Authors' calculations using SILC 2008-2017 (ELSTAT).

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