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Distributional Changes in Turbulent Times: Greece 2007-2016

Eirini Andriopoulou

(Hellenic Ministry of Finance and Athens University of Economics and Business)

Eleni Kanavitsa

(Athens University of Economics and Business)

Panos Tsakloglou

(Athens University of Economics and Business, IZA and Hellenic Observatory (LSE))

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Eirini Andriopoulou

Council of Economic Advisors, Hellenic Ministry of Finance and

Athens University of Economics and Business

Eleni Kanavitsa

Athens University of Economics and Business

Panos Tsakloglou

Athens University of Economics and Business, IZA and Hellenic Observatory (LSE)

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Abstract

This paper provides a detailed picture of the evolution of the level and the structure of inequality during the period 2007-2016, in which Greece faced one of the most severe debt crises among developed countries. The aim is to examine how changes in overall income distribution affected inequality between and within different socioeconomic groups and thus indirectly how the burden of fiscal consolidation was shared across population groups. The findings are linked with economic developments and policy choices of the period in question. The results show that inequality rose at the beginning and the peak of the crisis, but the magnitude of the change varies across different indices. The recorded increases are larger when the indices used are relatively more sensitive to changes close to the bottom of the income distribution. The increase in unemployment played the most substantial role for the decrease in income of a large share of the population, in combination with the absence of an adequate safety net. Inequality "within population groups" was far more important in shaping aggregate inequality than inequality "between population groups". The contribution of disparities between educational groups to aggregate inequality declined while that of disparities between different occupational groups rose.

JEL Numbers: D31, I31

Keywords: Greek crisis, inequality, decomposition analysis

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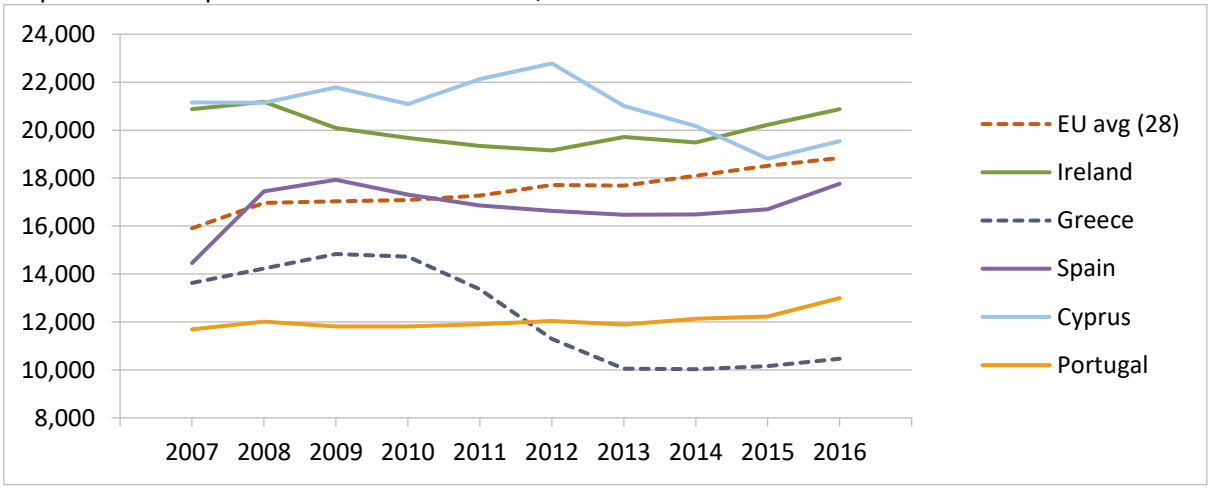
1. Introduction

Greece was hit severely by the financial crisis of 2008, suffering a cumulative GDP per capita decline of 26% from 2007 to 2013[1]. The extremely high public debt and deficit of 2009 put the country into a defaulting financial position that led to the first fiscal adjustment program, as financial assistance provided by the European Commission, the International Monetary Union and the European Central Bank. Along with the great decrease in GDP per capita, Greece faced the largest decline in mean equivalized household income between 2007-2013 compared to the other countries that also received financial support[2], as shown in Graph 1.

Graph 1. Mean equivalized net income in PPS, 2007-2016



Data source: EUROSTAT, EU-SILC 2008-2017 (Incomes 2007-2016).
Note: The values of EU avg refer to EU avg 27(2007-2013) for the years 2007-2009 and to EU avg 28 for the years 2010-2016 expressed in Euros.

Cingano (2014) points out that despite the increase of average real household income in all countries for the last 20 years before the onset of the crisis, the post-crisis picture altered a lot; the average real household income remained unchanged or fell in most countries, with Spain, Ireland, Iceland and Greece having the greatest decrease by more than 3.5% per year. Cumulatively the disposable income in Greece felt by 42% between 2009 and 2014 and therefore the drop was much larger than the fall in GDP per capita, although the decline started with a two-year lag (Andriopoulou et al. 2019).

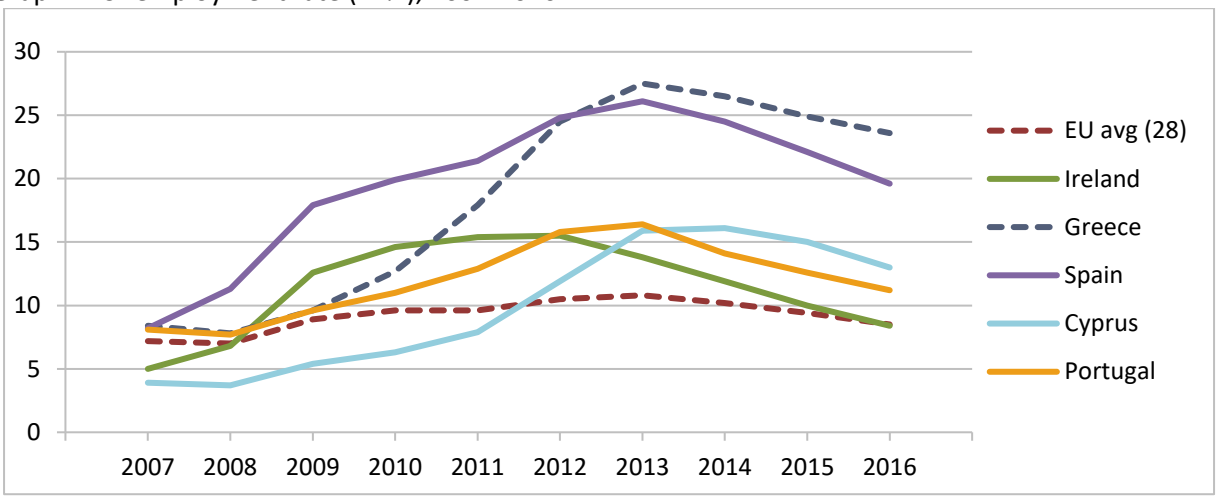
The decline in household income is mainly attributed to the decrease of labor income caused by the high rate of job losses. Unemployment rate in Greece was very close to the EU average in 2007 (7.7% vs. 6.8%), while the first three years of the crisis, the unemployment rate increased in almost all EU countries.

[1] See http://ec.europa.eu/economy_finance/ameco/user/serie/ResultSerie.cfm

[2] See https://ec.europa.eu/info/financial-assistance-euro-area-countries_en

However, in Greece, the increase was enormous (20 percentage point) reaching 27.5% in 2013, as shown in Graph 2. The unemployment rate in Greece exceeded the already highest unemployment rate of Spain and remained the highest among programme countries since then. However, after 2013, unemployment rate in Greece started declining, following the trend in the rest of EU countries. Both features, the increase of unemployment rate and decrease of household income are very often being the main drivers of rising income inequality (OECD 2011; Eurofound 2017; Ridao-Cano and Bodewig 2018).

Graph 2. Unemployment rate (in %), 2007-2016



Data source: EUROSTAT, LFS 2007-2016.

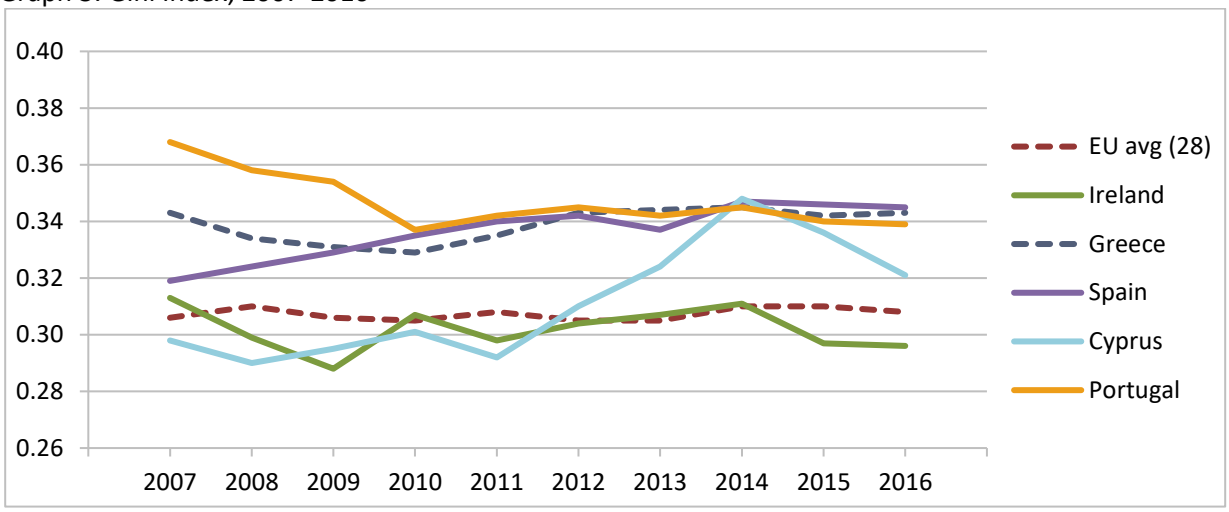
As Graph 3 indicates, the trend of the Gini coefficient[3] has been positive for all countries that implemented consolidation measures, with Greece experiencing an increase in income inequality within the first three years of the crisis and then being stabilized, while Cyprus faced the greatest increase between 2011 and 2015, when it started being reduced.

The positive relationship between inequality and fiscal consolidation is verified by the literature and particularly for expenditure-based consolidation episodes with causality going to both ways. Brinca et al. (2021) find that countries with higher income inequality experience significant stronger declines in output following decreases in government consumption. Agnello and Sousa (2014) prove that income inequality significantly rises during periods of fiscal consolidation, while fiscal policy that is driven by spending cuts seems to have more severe impact for income distribution. Heimberger (2020) also identifies a strong positive link between the size and duration of the austerity and the effects on inequality. On the contrary, Fabrizio and Flamini (2015) support that the progressivity of consolidation efforts depends on the specific

[3] The Gini coefficient is one of the most commonly used inequality indices taking values from 0 to 1, while the highest its value the more inequality indicated.

composition and design of measures. Moreover, Furceri et al. (2015) underline that the benefits of fiscal adjustments should be weighed against their likely distributional impact as they find that typical fiscal consolidations lead to an increase in income inequality on the order of 0.2–1.0 units (corresponding to a Gini index point) in the short and medium term.

Graph 3. Gini Index, 2007-2016



Data source: EUROSTAT, EU-SILC 2008-2017 (Incomes 2007-2016).
Note: The values of EU avg refer to EU avg 27(2007-2013) for the years 2007-2009 and to EU avg 28 for the years 2010-2016.

There is a number of empirical studies that examine the distributional impacts of the consolidation measures in Greece, using several data sources such as the Household Budget Survey and focusing only the short-term impacts of the consolidation measures mainly due to the time lag in data access. They conclude that some policies were progressive, but other have caused regressive effects in the income distribution.

Matsaganis and Leventi (2013) demonstrate that changes in inequality were less severe at the beginning of the crisis and that some austerity policies appear to have had a progressive effect, despite the fact that in relative terms, the poor seem to have contributed more to the government's fiscal consolidation effort than the rich. These early findings suggest that income inequality did not change in 2010-2011 but it increased significantly in 2012, and got worsen as the recession deepened, driven primarily by the steep rise in unemployment. In a later study, comparing the distributional implications of the crisis in Greece, Spain, Italy and Portugal from 2009 to 2013, the authors indicate that poverty and inequality in Greece have risen to alarming levels compared to the other countries (Matsaganis and Leventi 2014a). Despite the fact that the main driver of growing inequality is the recession, especially rising unemployment, rather than austerity per se, the implemented policies as well as the automatic stabilizers in place seem to fail in

addressing the increasing poverty and inequality trends (Matsaganis and Leventi 2014b; Andriopoulou et al. 2018).

Another aspect of inequality in this period is studied by Kaplanoglou and Rapanos (2018) using consumption data. They identify the weakening of the middle class as the driving factor of the increasing inequality consumption trend and alert that families with children massively moved to the lower-end of the welfare distribution. Moreover, they underline that the indirect tax hikes exacerbated consumption inequality. The fact that the crisis did not impact uniformly the whole population and often worsened the situation for the population sub-groups that were more vulnerable to poverty and inequality even before the crisis (such as the unemployed, temporary and part-time workers, single parent families and non-EU migrants) has been verified by many studies, as well as the emergence of new risk groups (households with more than one unemployed, persistent unemployed, working poor and the youth) (Mitrakos 2015; Andriopoulou et al. 2018; Giannitsis and Zografakis 2018).

The purpose of this study is to examine the evolution of the level and the structure of inequality in Greece for a larger period than the previous studies, in the decade 2007-2016, and also link the findings with economic developments and policies. In addition, we are particularly interested in examining the changes in inequality across and between different population groups, therefore we split the population using five different criteria: a) the occupational status of household head, b) the presence of at least one unemployed member in the household, c) to the age of the population member, d) the household type and e) the educational status of household head. In periods of rapid changes, as the one under examination, apart from incomes, the composition of population also changes, therefore we first present the changes in different population shares and the relative mean income of the above-mentioned groups (section 3.1). In section 3.2.1, we analyze the evolution of inequality in the total population using four different inequality indices, while then using only one of them, we examine the evolution of inequality in each population group. Subsequently, we measure the inequality “between” and “within” groups and then we focus only on the “between” groups component of inequality (section 3.2.2). Finally, we perform a trend decomposition analysis (section 3.2.3), in which we try to examine to what extent changes in aggregate inequality can be attributed to changes in inequality within group, to changes in the population share or to changes in the relative mean income.

2. Data and Methods

The data used in the analysis come from the Greek data set of the Survey of Income and Living Conditions (SILC) of the Hellenic Statistical Authority for the period 2008-2017 (corresponding to incomes with one-year time lag, thus 2007-2016). The official poverty and inequality statistics at national and European level are derived from the data of this harmonized cross-national longitudinal survey that runs in all European Member-States. 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.

Our analysis is based on the "disposable monetary household income", which is the sum of monetary incomes of all household members (members living under the same roof) from all income sources after the subtraction of direct taxes and social insurance contributions. The economies of scales and the differences in needs of households with differences in size and composition should be taken into consideration. Thus, household incomes are standardized using the household equivalence scales used by OECD[4] and 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[5].

Changes in the level of aggregate inequality are measured using four indices. The Gini index, the Mean Log Deviation (MLD, also known as the Second Theil index) and two members of the Atkinson family of inequality indices for inequality aversion parameters 0.25 and 0.75 (ATK0,25 and ATK0.75, respectively). Each index of inequality corresponds to a different Social Welfare Function and is relatively more sensitive to changes in different parts of the income distribution[6]. The Gini index is the most popular index and is relatively more sensitive to changes in the middle of the income distribution, the ATK0.25 is more sensitive to changes close to the top of the distribution, while the ATK0.75 and the MLD are more sensitive to changes close to the bottom of the distribution (Lambert 2002; Cowell 2011). This practically means that when a decrease in income occurs to an individual that is "poor", i.e., close to the bottom of the income

[4] See http://www.oecd.org/economy/growth/OECD-Note-EquivalenceScales.pdf

[5] For example, if a family with two children under 14 has an income of 21,000 euros per year, this income corresponds to 21,000/2.1=10,000 equivalized disposable income, where 2.1 is the equivalent scale of the household (1+0.5+2*0.3). In practice this means that each one of the four household members has an income equivalent to a person that lives alone and earns 10,000 euros.

[6] All indices satisfy the standard axioms of inequality measurement (symmetry, mean independence, population invariance and the principle of transfers).

distribution, the ATK0.25 and the MLD register a greater increase in inequality than the Gini and ATK0.25 indices. Further, MLD is "strictly additively decomposable"; that is, when the population is partitioned in non-overlapping and exhausting groups using a particular criterion (demographic, occupational, etc.), it allows the identification of the contribution of each population group to aggregate inequality as well as the identification of the contribution of disparities between population groups to aggregate inequality (Shorrocks 1980; Anand 1983; Tsakloglou 1993). Hence, MLD is used for the analysis of the structure of inequality and trend decomposition that we present in Section 3.2. The trend decomposition analysis or the "*shift-share analysis of inequality*" (Tsakloglou 1993) tries to explain how much of the overall change in inequality is attributed to changes in inequality within population groups, in changes in population shares and in relative mean incomes between two periods.

Following the practice of the Luxembourg Income Study (LIS) database, we applied "top and bottom coding" to our samples removing 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.

3. Results

3.1 Changes in population shares and relative mean income

In order to identify potential driving forces of inequality changes is important to discuss changes in population shares as well as in relative incomes of several population groups during the period of examination. As mentioned earlier, we decompose aggregate inequality by non-overlapping and exhausting groups using five criteria. The first group consists of eight categories identifying the occupational status of household head. Those eight categories include employers (i.e., 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" (i.e., inactive individuals like domestic careers, students, persons in military service etc.). However, due to the sharp increase in unemployment that may affect not only the household head but any other member, we create the second examined population group which is based on the existence of unemployed members in the household. This population group consists of two sub-groups, those individuals living in households with no unemployed members and those living in households with at least one (irrespective of whether the unemployed is the household head or not). The third partitioned criterion we apply is based on the age of population members. Three categories are formed: "youth" being

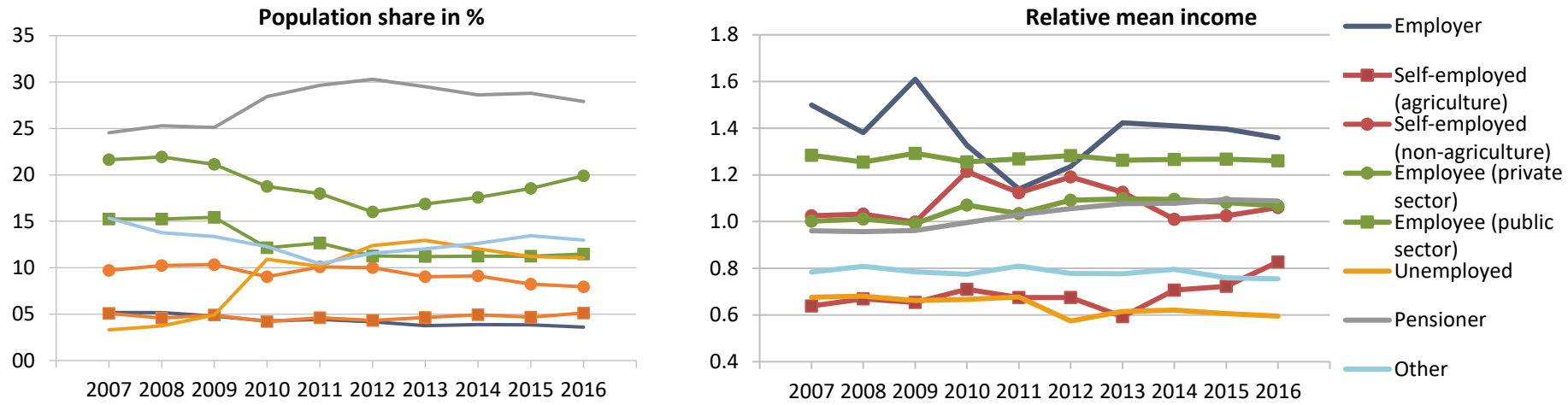
persons up to 17 years of age, working-age persons (18-65) and elderly (65 or over). Given the demographic issue that Greece faces with, according to Eurostat, a negative population growth of 2.3%[7] during the decade we examine, inequality levels for different age groups may have changed over time. According to ELSTAT, the decline in population is probably consequent of population ageing along with the high number of net emigrants that occurred during the crisis. The great majority of the emigrants were working age individuals, mainly young and relatively well educated. The changes in the household composition are also taken into consideration by splitting the population into seven different household types: one-person households or couples with both members aged below 65, one-person households and couples with at least one member aged 65 or above, 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. The last criterion we apply is according to the educational level of household head. We generate seven sub-groups based on whether the household head has or has not completed primary education, has attained either low-, upper- or post-secondary education and then whether she has tertiary education completed.

The set of Graphs 4i-4v represents the evolution of changes in population shares and relative mean incomes according to each partitioned criterion. Starting with the occupational status of household head (Graph 4i), we see the sharp increase by 6% in the share of individuals living in households with unemployed head between 2009-2010 reaching its highest point in 2013 (13%), when also the unemployment rate got its highest values since the beginning of the crisis. This shift is also in line with the decrease in the share of persons living in households with head being working in private or public sector between 2007 and 2013. Yet, the share increased substantially between 2013 and 2016 for the private sector employees (reaching 19.9% in 2016), and slightly for public sector employees (11.5%), in line with the negative trend of the aggregate unemployment rate, as discussed in Section 1.

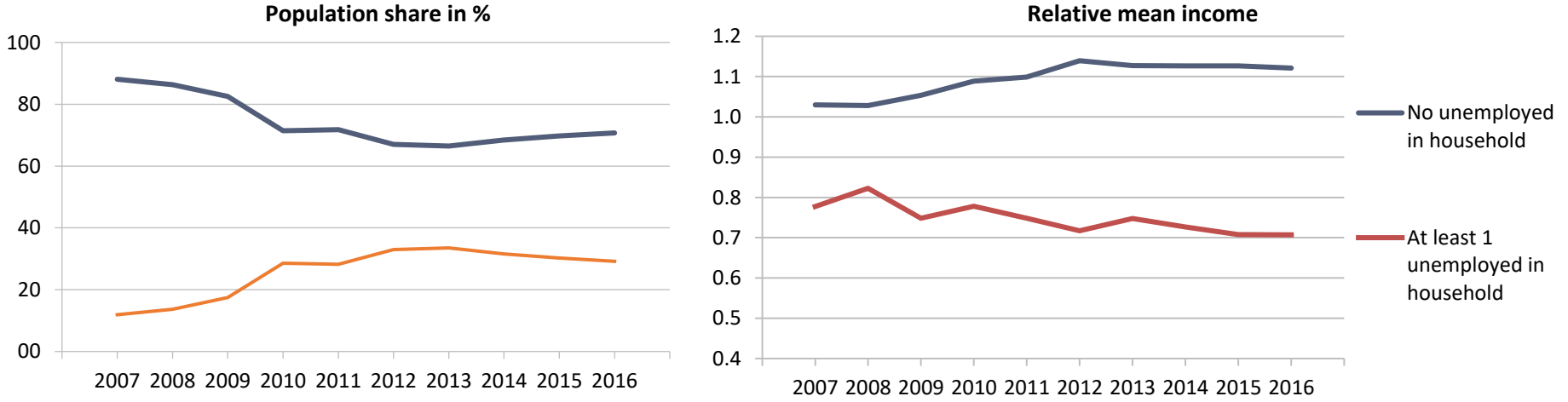
On the other hand, several people who were close to retirement chose to exist the labor market and take early retirement during the crisis, rising even more the already high share of individuals living in households headed by pensioners from 24.5% in 2007 to 30% in 2012 and then to be marginally reduced to 28% in 2016. Unlike what is often publicly discussed, the relative income position of pensioners rose during the crisis; despite the decline of income in real terms.

[7] https://ec.europa.eu/eurostat/databrowser/view/demo_gind/default/table?lang=en

Graph 4i. Population share and relative mean income according to the occupational status of household head



Graph 4ii. Population share and relative mean income according to number of unemployed household members



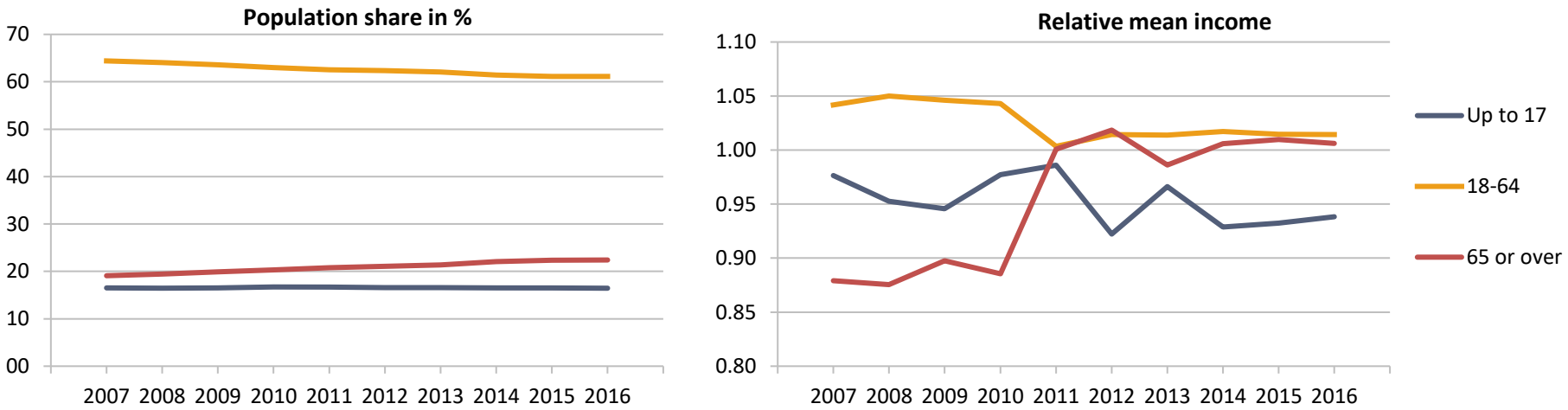
As illustrated in Graph 4ii, while the share of people who were living in households with unemployed members was relatively low in 2007 (12%), this percent almost tripled in 2013, with one out of three individuals in Greece living in households with at least one unemployed member (33%) and declined to 29.2% in 2016. In addition, the relative income position of this group worsened from 78% in 2007 to 75% in 2013 and further to 71% of the average national income in 2015 and 2016.

The decline in working age population discussed above is confirmed when we look at the share of population aged 18-64 showing a decreasing trend throughout the examination period (Graph 4iii). On the other hand, the share of elderly is getting increased, while the share of youth is stable at quite low levels (around 16%) throughout the decade. Interestingly, the aforementioned increase in the relative income position of pensioners is even more remarkable when we look at their position compared to the other age groups. In 2007, on average the elderly had incomes 12% lower than the population mean, while since 2011 their incomes are continuously around the national average income level (+/-1%). On contrary, the relative income position of young is constantly below the national average despite the relatively high fluctuation.

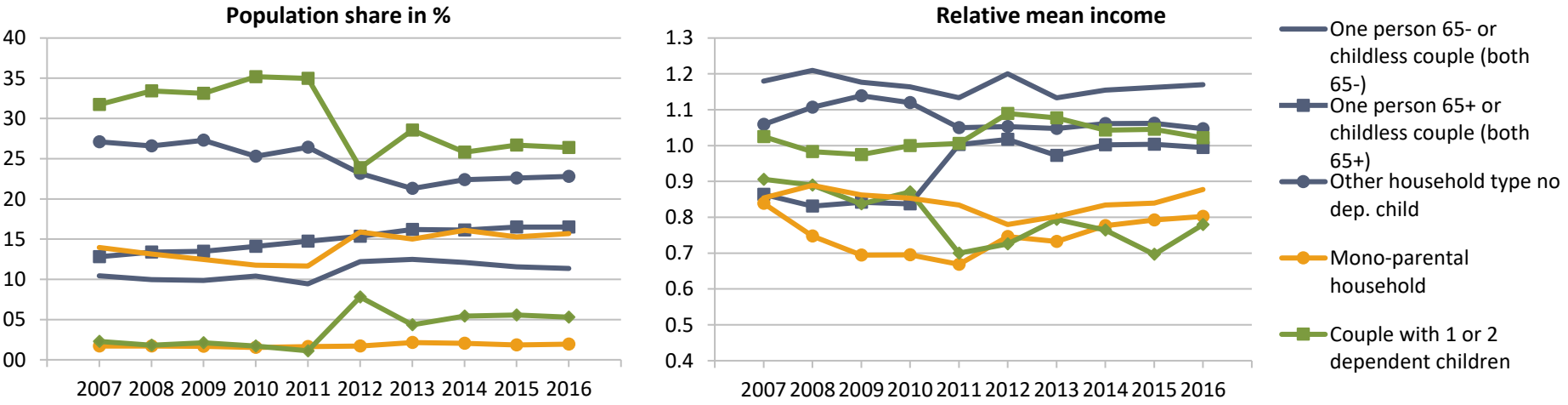
In overall, the population share of the different household types did not change considerably between 2007-2011 (Graph 4iv). Between 2011-2013, there was a significant decline in households with one or two dependent children and an increase in larger families with more than three dependent children. However, after 2013, the population shares are again being almost stabilized. In accordance with earlier findings, the relative income position of the elderly individuals living alone improved substantially. On the other hand, the relatively small but vulnerable groups of mono-parental households and, especially, those having more than three children appear being affected relatively more by the crisis, since their relative income position deteriorates, possibly due to a disproportional effect of unemployment on these household types.

As shown in Graph 4v, most individuals in Greece live in households whose head has attained the upper-secondary education with this share being risen from 29.4% in 2007 to 32.6% in 2016. It is encouraging that the share of those living in households with highly educated head is getting higher throughout the period, while at the same time, the corresponding percentage of those living in households with head who has completed the primary education has declined by 8% between 2007 to 2016. Despite the high share of individuals living in households whose head has attained the upper-secondary education, their relative income position has been constantly below the national mean. As may be expected, the incomes of persons whose household head has tertiary education completed were 50% higher in the pre-crisis period, however this percent declined during the crisis, reaching 35% of the national average in 2016.

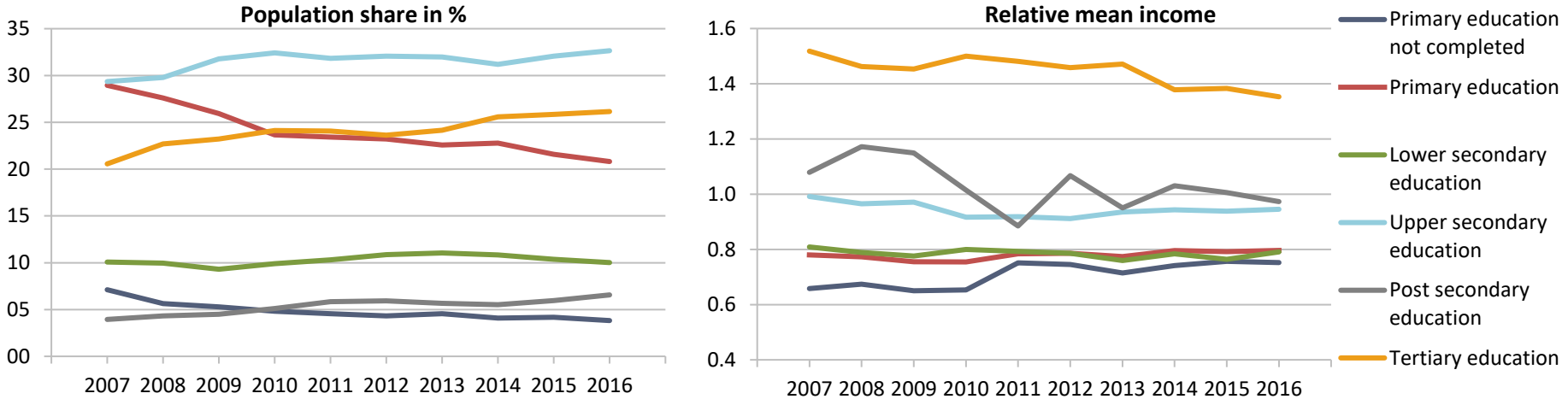
Graph 4iii. Population share and relative mean income according to the age of population member



Graph 4iv. Population share and relative mean income according to different household types



Graph 4v. Population share and relative mean income according to the educational level of household head

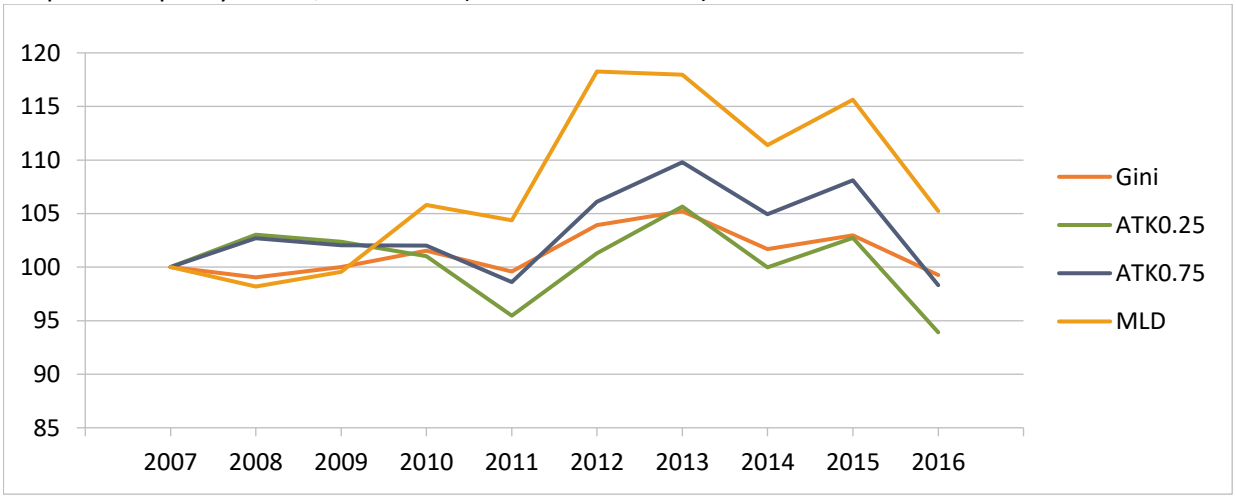


Data source: ELSTAT, SILC 2008-2017 (Incomes 2007-2016).

3.2 Evolution of Inequality trends and structure

In the first part of this section, we discuss the evolution of the four inequality indices used in this study, as mentioned in section 2. The results are illustrated in Graph 5. The four indices are standardized to 100 for the base year (2007) for comparison purposes. During the first years of the examined period (2007-2010), the changes in the indices were relatively small but not uniform. It seems that the implementation of the first fiscal adjustment program in 2010 has resulted a decline in all indices, with ATK0.25 performing the biggest change. Since this index is sensitive to changes that happen at the top of the income distribution, the increase in taxation may affected rapidly the top incomes compared to the decline in the incomes of the rest of the population. This picture changed completely in the next year (2012) when all indices indicate a sharp increase in inequality probably because of the sharp increase in unemployment and the lack of an adequate social safety net. The following year, all indices continue displaying an increasing trend apart from MLD that registered a very marginal decline. Between 2013 and 2014, all indices declined probably as a result of a slight reduction in unemployment in 2014 along with well-targeted policies towards the low-income families (a lump sum one-off "social dividend" to the poorest segment of the population, means-tested child benefits). Another jump in all indices occurred between 2014-2015, probably related with the unstable financial situation that the country faced once more, when capital controls in payments and income transfers were imposed. However, the year after, all inequality indices recorded a substantial drop up to 10 percentage points – except the Gini coefficient, for which the decline was modest. Concluding, looking at the whole period of examination (2007-2016), almost all examined inequality indices have returned to their pre-crisis level, while ATK0.25 is even lower than its pre-crisis value. Only MLD remains high but it has been reduced to its 2010's level.

Graph 5. Inequality trends, 2007-2016 *(normalized to 2007)*

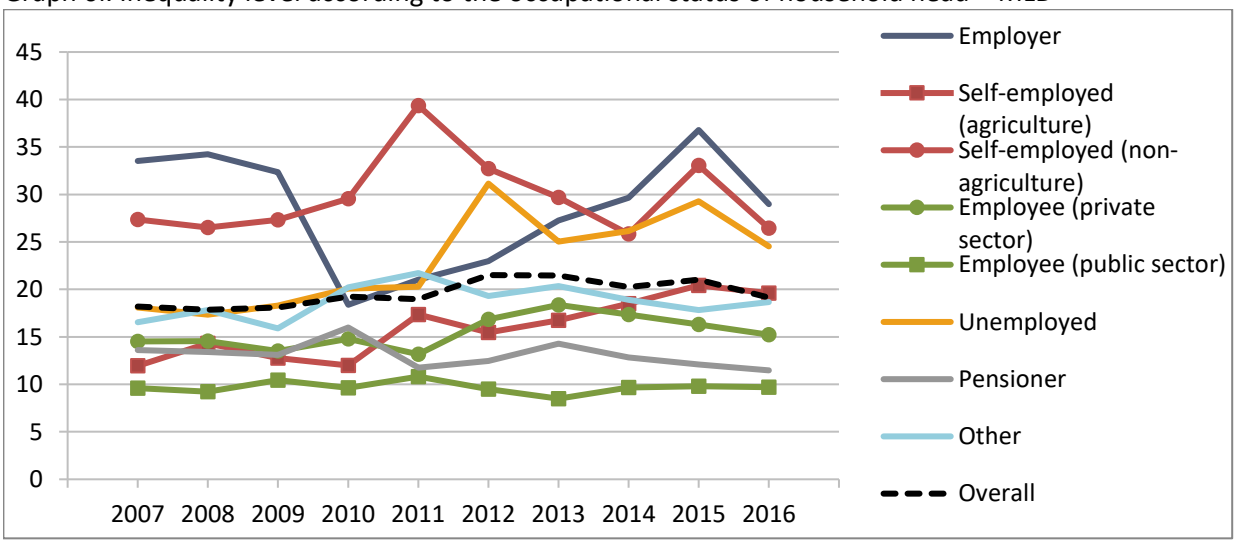


Data source: ELSTAT, SILC 2008-2017 (Incomes 2007-2016).

3.2.1 Inequality evolution by population groups

The evolution of MLD for each one of the categories that population has been partitioned is presented in the set of Graphs 6i-6v. In other words, these trend lines represent the level of inequality existing within each category compared also to the evolution of the aggregate level (black-dash line). In Graph 6i, the evolution among households with different occupational status of head is displayed. The inequality among employers seems to decline considerably in the first years of the crisis, especially between 2009-2010, when its trend started being again positive. The very low coverage rate of unemployed benefits is probably the reason why the inequality among households with unemployed head increased significantly between 2011-2012, when the expansion of the long-term unemployment benefit was introduced[8]. The already high inequality level among self-employed in agricultural sector increased even more the first years of the crisis, before returning almost to the pre-crisis level in 2016. Between 2007-2011, inequality among workers, irrespective of their employment sector (private vs. public), was relatively low and stable. However, after 2011, inequality among private sector employees increased marginally, while among public sector employees decreased. On the one hand, the increase in unemployment has affected mainly the private sector employees while, on the other hand, the cuts in public spending implemented under the fiscal consolidation programme have worked probably as equalizer in the wage distribution of public sector employees.

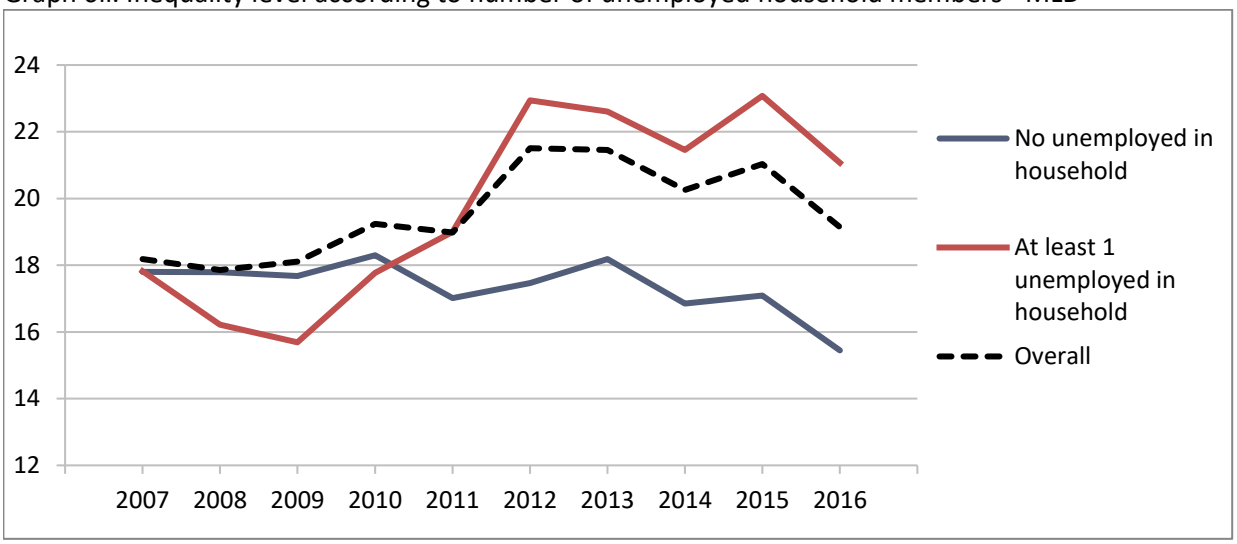
Graph 6i. Inequality level according to the occupational status of household head – MLD



[8] This is the unemployment assistance for older workers, which is paid to long-term unemployed aged 45-65, as eligibility for contributory unemployment insurance expires after 12 months. There is no general unemployment assistance scheme. The annual income threshold in 2009-11 was €5,000 plus €587 for every child. Since 2012, the threshold is €12,000 plus €587 for every child.

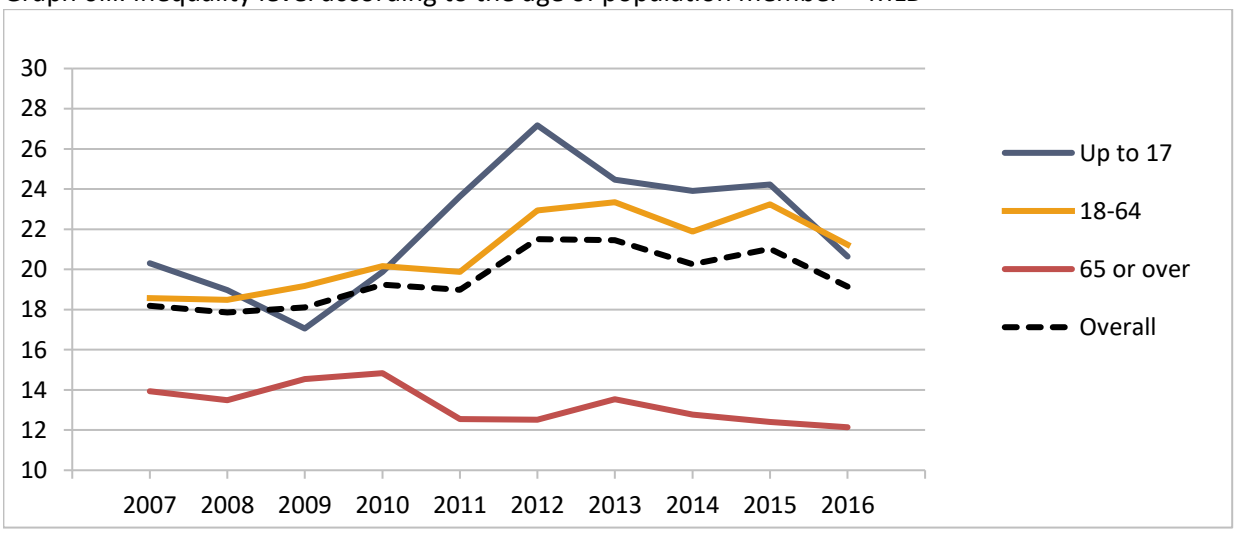
Focusing on the number of unemployed members in households as shown in Graph 6ii, the sharp increase in unemployment clearly determined the positive trend of overall inequality. As discussed earlier, the inequality among households with unemployed members increased about 7%, between 2009-2012 indicating the lack of an effective safety net for the unemployed based either on social insurance or assistance.

Graph 6ii. Inequality level according to number of unemployed household members - MLD



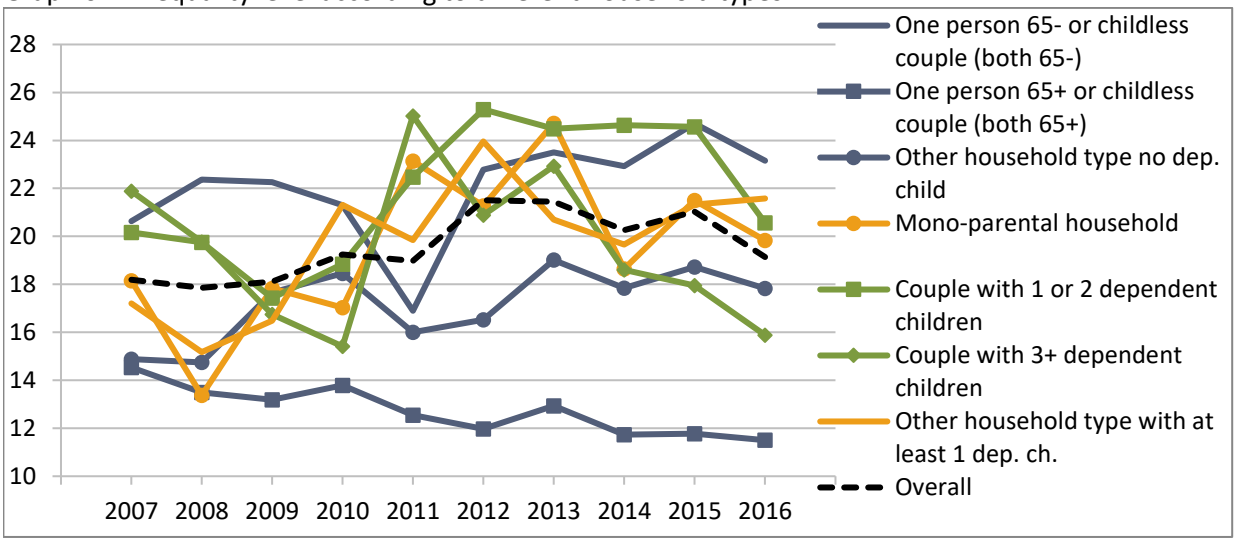
When the population is grouped based on their years of age (Graph 6iii), it is apparent that inequality in minor children increased sharply by 10% within the first three years of the crisis (2009-2012). Further analysis shows that this is due to the job losses of one or both income earners of a large share of households with children. Due to pension cuts implemented in 2010, the inequality among elderly declined by more than 2% between 2010-2011, then it was stabilized between 2011-2012 remaining at this low value since then, with the exception of 2012-2014 when it increased slightly.

Graph 6iii. Inequality level according to the age of population member – MLD



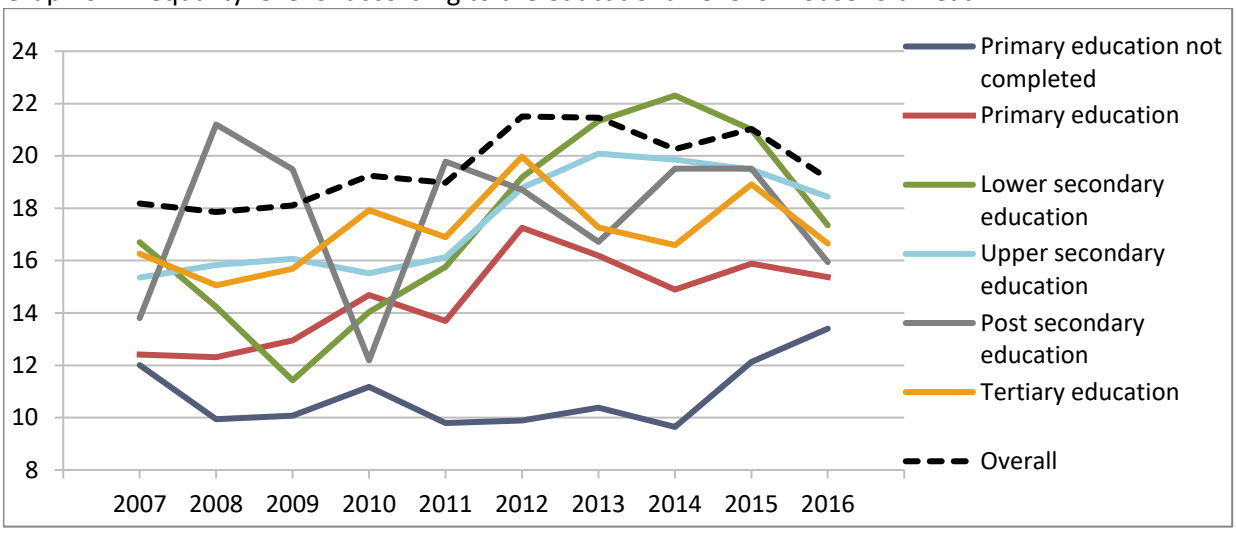
The picture is not so straightforward when the different household composition is being analyzing in Graph 6iv. Despite the various fluctuations in inequality within almost all different household types throughout the decade, the main points of interests are focused on families with or without children, especially between 2010-2013. The introduction of means-tested family benefits in 2013, replacing the previous non-means tested scheme contributed to the reversal of the increasing inequality trends among households with children in the previous period. Relatively younger single-member households or couples without children experienced also quite high levels of inequality during the examined period with an exception of inequality reduction between 2010-2011.

Graph 6iv. Inequality level according to different household types – MLD



Looking at the inequality when the population is split according to the educational level of household head (Graph 6v), our results confirm what the recent literature also finds; the most affected educational group is the secondary level graduates (Filinis et al. 2018). Households whose head has completed any secondary educational lever, either lower-, upper or even post- secondary level, faced the highest increase in inequality since the onset of the crisis up to 2015. Between 2015-2016, inequality within all groups declined with the exception of those households whose head has either primary education completed or not completed at all.

Graph 6v. Inequality level of according to the educational level of household head – MLD

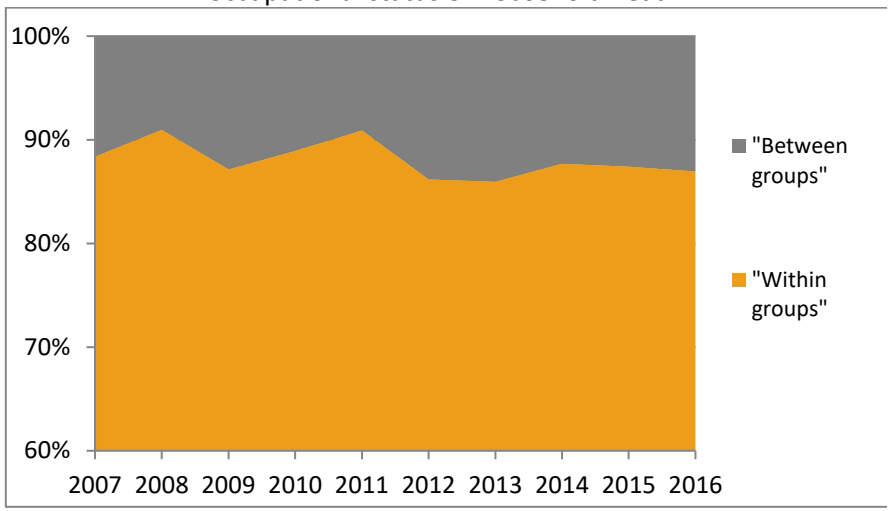


Data source: ELSTAT, SILC 2008-2017 (Incomes 2007-2016).

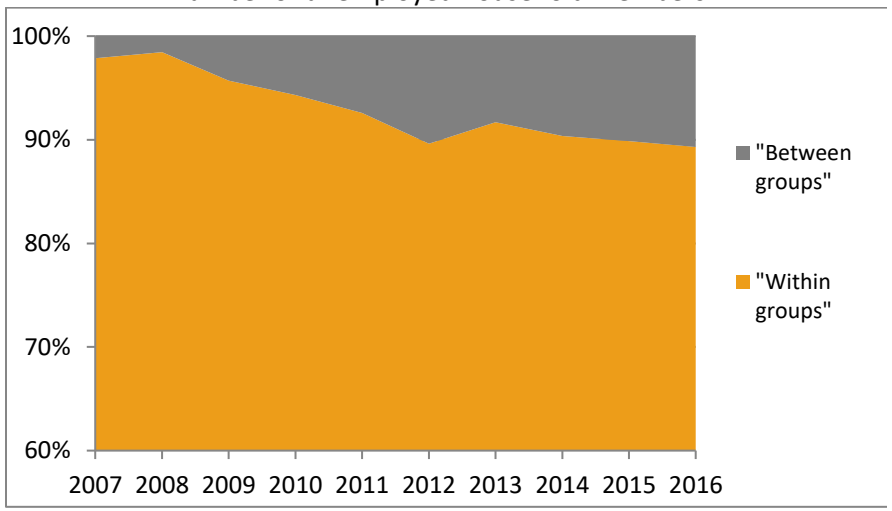
3.2.2. Inequality "between" and "within" groups

After decomposing aggregate inequality into inequality of each group over time, in this section we present the evolution of the "between" and "within" groups components of aggregate inequality (MLD). The "within" groups inequality is equal to the sum of group inequality estimates multiplied by the population share of the corresponding group, while the "between" groups inequality is the value of the inequality index if every population member has income equal to his/her group mean income. As the set of Graphs 7i-7iv indicates, regardless of the population group examined, the "within" groups inequality contributes the most in shaping the aggregate level, with some cases exceeding 90% of the overall level. Only when the applied partitioned criterion is the educational level of household head, the "within" groups inequality has a relatively less contribution to the aggregate level; however, it still contributes more than the "between" groups component.

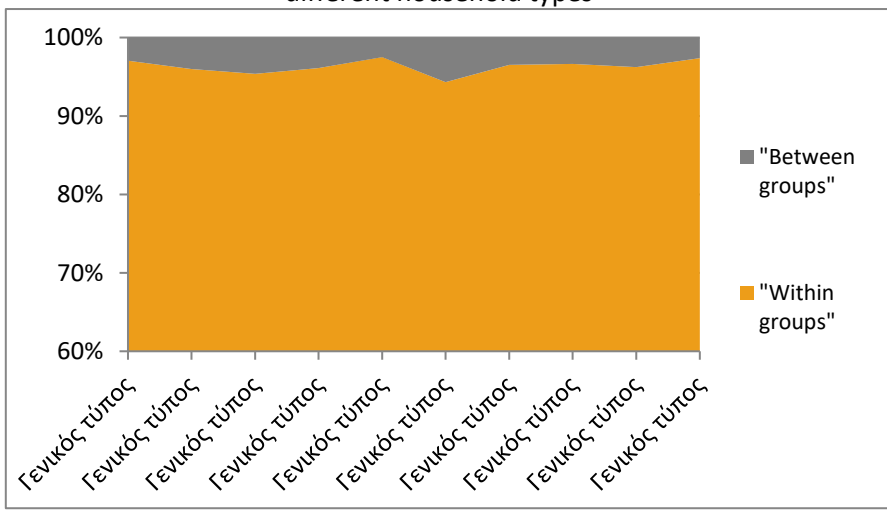
Graph 7i. "Within" and "between" groups inequality according to the occupational status of household head



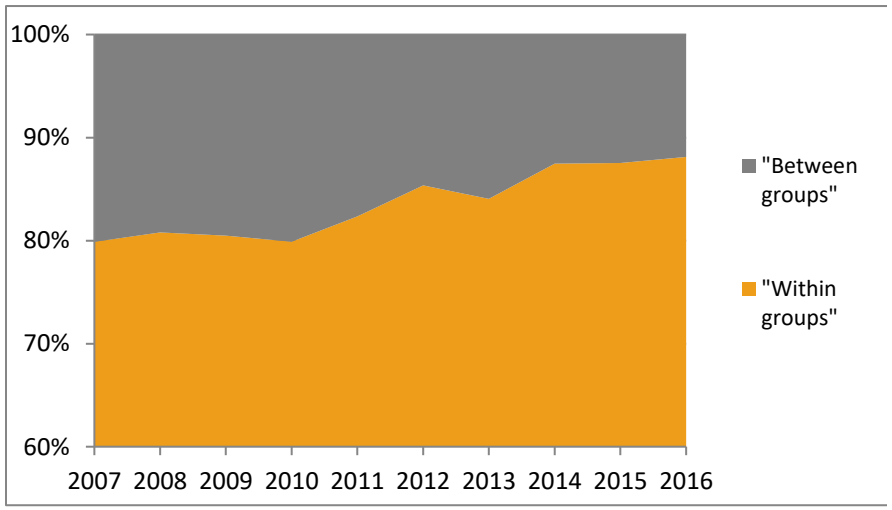
Graph 7ii. "Within" and "Between" groups inequality according to the number of unemployed household members



Graph 7iii. "Within" and between" groups inequality according to different household types



Graph 7iv. "Within" and "between" groups inequality according to the educational level of household head

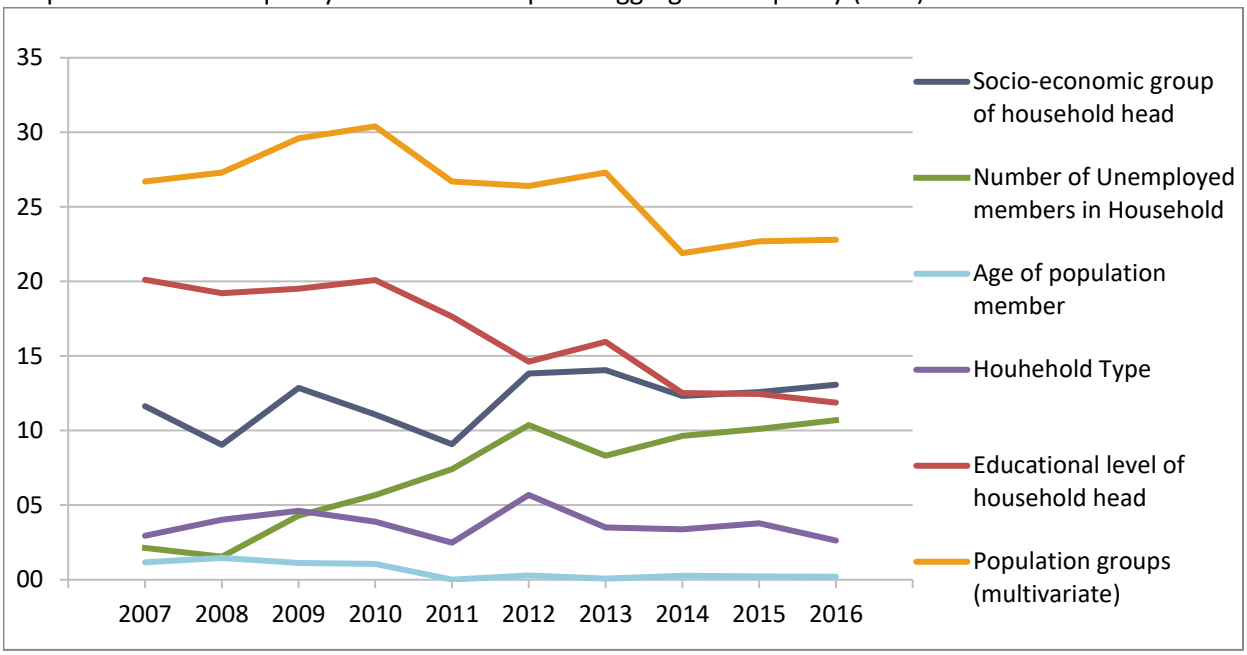


Data source: ELSTAT, SILC 2008-2017 (Incomes 2007-2016).

Note: The Inequality according to the Age of population members is almost totally attributed to "within" groups for all the examination period.

Despite the fact that aggregate inequality emanates primarily from differences "within groups", it is interesting to elaborate further the evolution of the "between" groups when also the population is grouped into smaller very homogenous groups[9]. In other words, we compute the percentage contribution of the "between" groups inequality to the aggregate inequality change, as it is shown in Graph 8. Even when the population is further grouped into 60 categories, the main result still holds; i.e., the contribution of the "between" groups inequality declines in time especially after the starting of the crisis. This is mainly resulted because one of the groups that consist the multivariate analysis is the educational level of household head that has shown the most remarkable change.

Graph 8. Share of inequality "Between Groups" in aggregate inequality (MLD)



Data source: ELSTAT, SILC 2008-2017 (Incomes 2007-2016).
Note: The "Populations groups" corresponds to a variable that consists of the three more affected partitioned population groups being according to the occupational status and the educational level of household head as well as the different household types.

[9] This type of decomposition is known as "multivariate decomposition" when the categories of two or more groups are combined in order to provide a more detailed analysis. In our case, the multivariate decomposition takes into account the different occupational status and educational level of household head as well as the different household type. Assuming that the educational level of household head consists of three categories (primary, secondary and tertiary), the occupational status of household head of five categories (self-employed, private sector employees, public sector employees, pensioner and other) and the household type of four categories (single adult <65 or couple <65 years of age and childless, single adult >65 or couple >65 years of age and childless, other household type with no children and household with at least 1 child), we compute the "within" and "between" groups inequality among the 60 different combinations that are resulted.

The “between” groups inequality for the different educational level of household head has been reducing in importance since 2010. This means that the high unemployment rate occurred during the crisis, regardless the educational level attained, may have worked as equalizer among the different categories of educational status that household head has attained. This is in accordance with other studies focusing on unemployment during the Greek crisis, which identify that while highly educated individuals experienced substantially lower unemployment rates than the other groups, their contribution to unemployment in 2016 was roughly on par with those with low educational credentials, while the group mostly hit by unemployment was that of middle educational attainment (Filinis et al. 2018). Due to the structure of the Greek economy, it seems that low skilled jobs located primarily to low–added value sectors of the economy were not that severely hit from the crisis, while the demand for middle and high-skilled individuals decreased because of the disinvestment in the economy.

On the other hand, when the number of unemployed members in household is considered, the importance of the “between” groups inequality is constantly increasing throughout the examination period. The same trend is also followed by the contribution of the “between” groups inequality when the partitioned criterion is the different occupational status of household head, which is highly affected by the evolution of the “unemployed” category, which shares increased significantly.

3.2.3 Trend decomposition analysis

In this section, we present a decomposition of the trend in aggregate inequality. Applying a “shift share” analysis of inequality (Tsakloglou, 1993), we examine to what extent the overall changes in aggregate inequality can be attributed (i) to changes in the values of inequality within population groups, (ii) to changes in the population shares of the corresponding groups and (iii) to changes in the relative mean incomes of those various groups. The results are reported in Table 1 analyzing the changes of the MLD between 2007-2013, 2013-2016 and then the whole examination period, 2007-2016.

Table 1. Inequality trend decomposition – MLD (2007-2016)

Characteristic of HH head or HH member	Period	Overall percentage change	Contribution (%) to changes in inequality due to changes in…		
			inequality within group	***population shares***	***relative mean income***
Occupational status of household head	2007-2013	17.9	11.2	28.7	-22.0
	2013-2016	-10.8	-7.4	-3.6	0.2
	2007-2016	**5.1**	2.6	24.9	-22.4
Number of unemployed household members	2007-2013	17.9	7.5	43.8	-33.4
	2013-2016	-10.8	-11.0	-9.7	9.9
	2007-2016	**5.1**	-6.7	38.0	-26.2
Age of population members	2007-2013	17.9	19.9	0.3	-2.3
	2013-2016	-10.8	-10.4	-0.4	0.0
	2007-2016	**5.1**	7.3	0.3	-2.5
Household Type	2007-2013	17.9	16.9	5.9	-4.9
	2013-2016	-10.8	-9.0	1.6	-3.5
	2007-2016	**5.1**	6.3	6.2	-7.3
Educational level of household head	2007-2013	17.9	17.5	-18.6	19.1
	2013-2016	-10.8	-5.6	-6.9	1.8
	2007-2016	**5.1**	11.2	-26.3	20.3

Data source: ELSTAT, SILC 2008-2017 (Incomes 2007-2016).

Regardless of the partitioning criterion used to determine the various population groups, as already discussed, the highest increase in aggregate inequality was reported between 2007 and 2013 (17.9%), when also both the unemployment rate increased sharply and the GDP per capita reduced considerably. On the opposite side, the aggregate inequality reduced by 10.9% during the period of 2013-2016, when the household disposable income started to increase. Finally, the aggregate inequality in 2016 was 5.1% higher than it was before the onset of the crisis in 2007.

Now, when the population is partitioned according to the occupational status of household head, in the first sub-period, the increased inequality level can be mainly attributed to changes in population shares; albeit the increase of the "within" groups inequality contributed positively to the aggregate level too. However, it is worthy to point out that the negative contribution of the reduction in relative mean incomes for this group is not less important for this period being a bit more than 20%. On the other hand, in the second sub-period, the decline in overall inequality was almost entirely resulted by the decrease in "within" groups inequality. Changes in population shares were strongly inequality-enhancing in the overall

period under examination, whereas changes in relative mean incomes of groups played a strong negative role, resulting the modest increase in aggregate inequality reported of around 5%.

When we focus on the number of unemployed members in household, the aforementioned results are even more pronounced. In the first sub-period, the share of households with unemployed members increased dramatically causing further increase in overall inequality. At the same time, the high share of job losses that resulted significant reduction in relative mean incomes contributed negatively in the overall percentage change of inequality. Reversely, the decline in aggregate inequality observed in the second sub-period is mainly attributed to the reduction in the "within" groups inequality together with the negative contribution from changes in population shares. The decline in the relative mean incomes and in the "within" groups inequality that happened in the period 2007-2016 was not large enough to cancel out the great increase in the overall inequality that occurred due to the positive change in population shares of these groups concluding to the final increase in overall inequality.

Looking at the different age groups, we observe that regardless of the examining period, the change, being either positive or negative, is almost entirely attributed to changes in the "within" groups inequality. The picture is similar when the partitioned criterion applied is based on the different household types. The "within" groups inequality appears to be the main contributor to the change of the aggregate inequality level.

Last but not least, when the population is grouped according to the educational level of household head, in the first years of examination, the whole positive change of inequality is attributed to the increase in the "within" groups inequality; however, not because the other two possible factors play a less important role but because their changes are almost equal but at the same time with opposite directions. In the second sub-period though, the negative change in aggregate inequality is resulted by the negative change in both "within" groups inequality and in population shares. On the other hand, despite the significant negative contribution of changes in population shares observed in the entire examination period by 26%, the positive percentage contribution of the changes in "within" groups inequality and in relative mean incomes concluding to the overall positive percentage change of 5%.

4. Conclusions and Policy Implications

In the period under examination, inequality did not follow a uniform pattern, as depicted by all indices employed in our analysis. The implementation of the first fiscal adjustment program resulted in a decline in inequality in 2010. Yet, in the next two years and before the start of the second adjustment programme in 2012, a sharp increase in inequality took place probably because of the sharp increase in unemployment

and the lack of an adequate social safety net. The following year, the increasing trend persisted, but inequality declined in 2014 due to the improvement in macroeconomic conditions and the disbursement of the "social dividend". The declining path was reversed in 2015 as a result of the unstable financial situation of the economy. Yet, in the next year, inequality recorded a substantial drop and started a declining path. In total, according to MLD index of inequality, inequality rose by almost 17.9% in the period 2007-2013 and dropped 10.8% between 2013-2018, resulted in a total increase of 5.1% between 2007-2016.

When partitioning the population according to the occupational status of the household head, the groups that faced the highest increases in inequality were the unemployed and self-employed (non-agriculture). As far as the age groups are concerned, the children were more severely hit followed by adults less than 65 years old, while those over 65 improved their relative position and presented a decreasing inequality trend. Inequality clearly increased much more for all types of families with children as compared to other household types.

In total, inequality "within population groups" was far more important in shaping aggregate inequality than inequality "between population groups". The contribution of disparities between educational groups to aggregate inequality declined while that of disparities between occupational groups rose. The multivariate analysis of "between groups" inequality verifies this remarkable change related to the educational groups. The finding could probably be explained by the fact that low skilled jobs located primarily to low–added value sectors of the economy were not severely hit by the crisis, while the demand for middle and high-skilled individuals decreased because of the disinvestment in the economy. This resulted in a diminishing protection offered by education with regards to unemployment and poverty and worked in inequality terms as an equivalizing effect. Finally, the trend decomposition analysis reveals that in some cases the effects of the changes in population shares and relative mean incomes, operated in opposite directions and were larger than the effects due to changes of inequality within groups.

In terms of policy implications, the analysis in this paper reveals that unemployment was the underlying factor of the increase in inequality during the first period of the crisis, in combination with the absence of a proper social safety net. As Keeley (2015) highlights work is key to reducing inequality and to ensuring that families do not get trapped in poverty, a serious concern in many OECD countries since the start of the financial crisis. To this end, it is important for governments to build the economic conditions for jobs creation, aiming to increasing participation rates, especially for women and the youth in periods of recovery and to prevent job losses and long-term unemployment by relinking individuals back to the labour market through reskilling, upskilling, profiling and matching programmes.

The current analysis cannot disentangle the policy effect of reforms in each year from the general growth effect. In order to make clear conclusions on which reforms were regressive or progressive, microsimulation techniques should be employed. Nevertheless, given the general macroeconomic environment of the period under examination, some general conclusions can be drawn as far as the role of taxes and social transfers is concerned. Since 2013, when the system of benefits became more targeted, limiting allowances that disproportionately benefit high earners, we observe a gradual decrease in inequality. In particular, the restructuring of family benefits in 2013 and the means-tested social dividends, helped towards this direction. However, the introduction of a guaranteed minimum income scheme was implemented too late[10], and much after the peak of the crisis.

As Koutsogeorgopoulou et al. (2014) underline, the unemployment insurance benefit coverage remained low during the whole period of the crisis, with less than 50% of short-term unemployed receiving it in 2012, down from 65% in 2010, even as unemployment surged. Moreover, the reduction of the minimum wage in 2012 by 22% along with the introduction of the sub-minimum wage for youth[11] resulted in a corresponding 22% reduction in unemployment insurance benefit. In 2012, the eligibility criteria for the unemployment assistance benefit for the long-term unemployed were expanded and the age coverage increased in 2014. Yet, these policy changes, resulted in a limited improvement, as the coverage remained low compared to the extent of the problem. According to Eurostat, 73.5% of the total unemployed were long-term unemployed in 2014 and the figure has stabilized over 70% since then[12].

Complementary to the benefit system is the effect of taxation on inequality trends. In general, taxation changes during the economic adjustment programs were designed from the perspective of yielding the highest possible fiscal revenue and in very few cases their distributional effect was examined in advance. Yet, this does not mean that progressive reforms did not take place also with regards to taxation. A good example is the 2011 reform of personal income taxation that was designed to have the largest fiscal gains, but at the same time, ceteris paribus, achieved the highest decrease in income inequality. On the contrary, the 2013 reform did not yield the expected fiscal results while at the same time reduced the redistributive strength and the progressivity of the Greek tax system (Leventi and Picos 2019).

It should be also highlighted that in the years of rising inequality, progressive reforms took place, but the overall impact of reforms in combination with the worsening macroeconomic conditions - mainly the

[10] The national rollout of GMI took place in 2017.

[11] The reduction in minimum wage by 22% in 2012 resulted in applying two minimum wages according to the age of workers. On the one hand, the minimum wage was set at €510.95 for employees aged 25 or below and at €586.08 for employees aged above 25.

[12] See: https://ec.europa.eu/eurostat/databrowser/view/une_ltu_a/default/table?lang=en

sharp rise in unemployment - led to the opposite than the intended direction. Further, many of the reforms in the benefit system undertaken in 2013 were progressive. Yet, despite this progressivity, inequality in 2013 rose either due to policies that moved in the opposite direction (e.g., the 2013 Personal Income Tax reform) or due to the general macroeconomic effects.

Another issue to rethink about is the role of pensions in redistribution. It is often mentioned in the public discourse that pensioners were more severely hit during the crisis than the rest of the population, while our results show that pensioners improved their relative position despite the large pension cuts. Given that the calculation of pensions before the crisis was based on many different schemes, there is no clear evidence on the degree of reciprocity versus redistribution before the crisis. Giannitsis and Zografakis (2018) highlight that the growing deficits of the social security system were associated with growing inequalities such as, partial and preferential access to subsidized income, low age-related eligibility requirements, access to pensions with asymmetrically low contributions, and other similar phenomena. Yet, during the crisis the pension cuts took place in a progressive way, in the sense that larger pensions were cut proportionally more than smaller pensions, which improved income distribution within the group of pensioners, as indicated by the decreasing within group inequality for this group in our results.

In total, addressing inequalities in a period of severe fiscal consolidation with fast diminishing incomes for the vast majority of the population does not seem an easy task for a government to perform. The limited fiscal space makes it more important to ensure that public spending delivers maximum benefits not only in terms of pecuniary transfers but also with regards to the provision of public services such as education and health care that are particularly important for improving social conditions for the low-income households.

This paper offers a detailed analysis of the evolution of the level and structure of inequality in the period of the Greek economic crisis. Yet, further analysis is needed in order to isolate the effect of policy measures from the effect of austerity on the economy and the general macroeconomic conditions. In most of the recent reports of International Organizations on the economic impacts of inequality, the discussion focuses on how to make growth more inclusive. From the Greek crisis, a question emerges on whether it is also possible to make fiscal consolidation periods “inclusive” by distributing fairly the burden sharing across different socioeconomic groups.

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