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THE GREEK CRISIS: ASPECTS OF POVERTY & INEQUALITY

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1. Abstract

This study addresses the socioeconomic impact of the current Greek crisis, by calculating and interpreting the changes in inequality and poverty rates for the period 2008 - 2013. This crisis is widely thought to be having significant socioeconomic effects, as it caused inequality and poverty to increase. This study is divided in two main parts; the first consists of a theoretical economic analysis, in which the Greek crisis is presented and discussed. Furthermore, there is a theoretical establishment and description of the main methodologies and measures for poverty and inequality. The second part is an empirical econometrical analysis on EU Statistics of Income and Living Conditions for Greece of 2008 and 2013, serving the scope of this study to examine the effects of the crisis on the wellbeing of the individuals.

Contents

I. Theoretical Economic Analysis

2. Analysis of the Greek crisis

In 2009, Greece entered a severe economic and financial crisis, which many identified as a liquidity crisis. However, this crisis was rather caused by lack of competitiveness (Τσακλόγλου, Οικονομίδης and Παγουλάτος) and was later proved to be a solvency crisis (Summary of the Annual Report 2012). It was mainly a result of not instituting necessary structural reforms, crucial for the viability of the economy. Greece has been supporting its economy by expanding domestic consumption, while financing it through external financing. After a decade of fast growth, the hidden weakness of the Greek economy was revealed in late 2009, when the incoming government announced that earlier fiscal data had been misreported. Deficit was raised from 3.7 percent to 15.7 percent of GDP and similarly debt increased from 99.6 percent to 129.7 percent of GDP (Τράπεζα της Ελλάδος).

International markets were shocked and once the Greek crisis assumed unanticipated dimensions, they responded by lowering credit ratings which resulted in an increase in spreads.[1] The country had to tackle its large budget deficit, to support a high and fast rising public debt-to-GDP ratio. In addition, it had to improve the eroded competitiveness of its economy without being able to implement any monetary policies since it unable to control its own currency. In an attempt to control public finances, the Greek government announced the first round of austerity measures in March 2010 (Matsaganis and Leventi, The Distributional Impact of the Greece Crisis in 2010). The targets were included in the updated stability programme (ΕΠΣΑ 2010-2013, January 2010) and were part of a frontloaded fiscal consolidation programme (Τράπεζα της Ελλάδος). However, this did not lead to the results Greece was expecting and shortly after that, the rating agency S&P downgraded the country's credit range to junk status, meaning Greece lost access to the international financial markets. At the same time, the incremental cost of borrowing went that high that prohibited the issuing of any new bonds, while uncertainty for the future led to downgrading of Greece's credit rating multiple times.

The Greek government in May 2010 signed the first Memorandum of Economic and Financial Policies. This came along with the exceptionally big €110 billion bailout package that was agreed with the European Commission, the

[1] The reader should keep in mind that the Greek crisis erupted shortly after the 2007 international financial crisis, coinciding with stagnant growth worldwide.

European Central Bank and the International Monetary Fund (Troika). It was a bailout designed to cover Greece's borrowing needs for the next 3 years, which was a period assumed sufficient for the country to recover and return to the markets.

This Memorandum was redirecting economic policy mainly in three directions. Firstly, it implemented frontloaded fiscal adjustment, mainly with horizontal measures such as sharp tax increases and extensive spending cuts, which were expected to lead to a reduction in country's public deficit below 3 percent of GDP by 2014 (Directorate - General for Economic and Financial Affairs) and would eliminate the primary deficit in a two-years period. It then included structural reforms on state operations, targeting the long-term viability of these adjustments and creating high primary surpluses for debt reduction. Secondly, it included structural reforms on the operation of markets, to improve the country's competitiveness and to create an entrepreneurial environment able to attract investors. Finally, the third direction was to ensure the stability of the financial sector. Of those three targets, the first one was the cornerstone of the programme.

A second austerity package was announced thereupon, to prove the trustworthiness of the government and to help decrease the government's deficit. More specifically, the major structural reforms that were introduced in 2010 and 2011 were

a) labour market reforms,
b) liberalization of regulated sectors,
c) privatizations,
d) liberalization of the product markets,
e) public sector reforms, i.e. mergers and/or discontinuation of the State bodies that did not serve a purpose,
f) reformation of the pension system, etc.

(Bank of Greece). A tax reform was also included, introducing changes in the schedule of personal income tax, a raise at the maximum rate, the introduction of a new solidarity tax, a rise in unemployment contributions, and a clampdown on tax evasion (Matsaganis and Leventi, The Distributional Impact of the Greece Crisis in 2010). However, after a joint Commission/ECB/IMF mission met with the Greek authorities in Athens on 15-22 November 2010, the European Commission reported that even though there was a strong start with major changes in fiscal consolidation and structural reforms, the implementation of the programme itself had become more difficult.

The provisions of the loan and the austerity programme have been revised several times since May 2010 and the chronic weaknesses of the Greek system have been fully confirmed. The liquidity issues had not been resolved and at that point, the recovery of the economy was largely dependent on the dynamic implementation and promotion of the structural reforms. According to the European Commission, some of the main features that characterised the fiscal year 2010 were the large shortfalls in tax collection and the under-execution of the state's spending plans (Directorate - General for Economic and Financial Affairs). Collection results were disappointing and target was revised downwards on several occasions. At the same time, in order to offset revenue shortfalls and unfavourable local government and social security accounts, the Greek Government under-executed ordinary state primary spending and military procurement-related payments by around EUR 4.9 billion (more than 2 percent of GDP) compared to the plans of May 2010. (Directorate - General for Economic and Financial Affairs) Therefore, the Greek Government and the Troika agreed to implement additional measures to secure the 2011 deficit target and to improve fiscal management on the expenditure side of the budget. These measures were embedded in the Medium-term Budget Strategy.

When the Greek Parliament approved the Medium Term Fiscal Strategy of 2012-2015, the Euroarea summit of July 2011 improved the terms of the programme by lowering interest rates and expanding repayment period. Nevertheless, as the deal proved ineffective against the markets' bet that Greece could not sustainably service its foreign debt and would therefore be forced to default, the European summit of October 2011 opened the way to negotiations regarding the reduction in the nominal value of Greek government bonds and a new €130 (Τράπεζα της Ελλάδος) billion loan. New measures were needed in order to adhere to the Medium Term Fiscal Strategy's targets and a temporary special duty was imposed on properties supplied with electricity (EETIDE).

The most significant development in 2011 was presumably the deep deterioration of the economic activity and the excessive unemployment. This was a result of the existing uncertainty and the contraction in domestic demand. This uncertainty stemmed from the reluctant approach that was established in the second year of the programme, as there were hopes that some of the agreed measures would not be necessary and could be avoided. Howbeit, this only worsened the already fragile status of the economy and led to new measures and thus, the adjustment cost was eventually greater. Many then believed that the adjustment programme had failed and that there

was no real outcome or improvement from the series of the painful measures, without palpable/concrete effects.

The expectations were, that in the future the situation would constantly deteriorate, and thus a negative effect on consumption and investment, only to intensify the vicious circle. Moreover, the credibility of the agreement between the Greek government and Troika was undermined and this caused a strong domestic reaction. Even though the bailout package had practically saved the almost bankrupt economy, a new political cleavage emerged (those in favour versus those opposed to the bailout package), modifying older divisions (pro-Europe versus anti-Western), (Left versus Right) and populist formations on the radical Left and the extreme Right prospered (; (Doxiadis and Matsaganis) (Matsaganis, The Greek Crisis: Social Impact and Policy Responces). It is easy to understand that the government's cohesion was eroded and the political stability was threatened.

Uncertainty had vastly increased after September 2011 and the discussion on the exit of the country from the Eurozone was intensified. This had paralyzing effects for the Greek economy and caused an outflow of deposits and further instability in the political system. The peak of this outflow was on October 31, when the Prime Minister G. A. Papandreou announced his intention to proceed with a referendum on the loan agreement, which finally led to the government's resignation.

After a restructure of the public debt, in which the participation of the private sector was larger than initially planned, and after repurchasing public debt, the Greek debt was then reduced by €137.9 billion in total. Nevertheless, as there were still many necessary changes to be implemented, various concerns regarding the sustainability of the Greek debt, as well as other negative factors of the above said implementation of the debt reduction (e.g. the balance sheets of Greek banks had severely deteriorate and were in need of recapitalization), there was a need for new regulations. These regulations were imprinted in a new "Memorandum of Economic and Financial Policies" and the "Memorandum of Understanding on Specific Economic Policy Conditions", which were adopted by the Parliament on February 12, 2012. Part of this agreement was also a new financial-support package amounting to €130 billion.

To explain a bit more why the situation constantly worsened, it should be underlined that a probable cause that undermined the success of the programme, was the fact that the austerity policies were introduced while the Greek economy was already in recession. Therefore, as the demand for goods and services fell, many businesses went bankrupt while many staying

afloat resorted to layoffs and/ or pay arrears. As a result, unemployment rates raised sharply. Things got worse after February 2012, when the Troika persuaded the government to try internal devaluation (Matsaganis, The Greek Crisis: Social Impact and Policy Responces). This strategy targeted to boost competitiveness, revive the economy and reverse the rise in unemployment; it was therefore addressing the main issues of the Greek economy. Its main feature was a drastic cut in the minimum wage by 22 percent in nominal terms. However, it is highly uncertain whether the internal devaluation actually worked (Matsaganis, The Greek Crisis: Social Impact and Policy Responces). Although the trade deficit did improve, on closer inspection this was a result of changes in demand rather than a supply-side effect. Meanwhile, unemployment continued to rise, even though arguably at a slower rate. In terms of earnings, the fall in minimum wages had wider repercussions, reinforcing the adverse effects of the recession: average gross earnings in non-banking firms fell in real terms by 10.6 percent in 2012, compared to a decline of 4.9 percent in 2011 (Bank of Greece).

However, the instability in the inner layers of the country created the need for new elections, which in turn delayed the implementation of the new measures and led to significant deposit outflows from the Greek banks. The depression was exacerbated and the unemployment kept rising. The newly elected government of June 2012, a coalition between the parties of New Democracy, PASOK and the Democratic Left, had a very difficult duty to do: re-stabilize the country and restore the lost trust.

Even though by the end of September 2012 most of the quantitative criteria had been met, the targets of the Second Memorandum were reviewed again. After October 2012, many rapid developments took place, e.g. the enactment of the Governmental Budget for 2013 and the Medium Term Fiscal Strategy of 2013-2016. For the first time since 2002, a primary surplus of 0.4 percent of GDP was expected for Greece, while in the Medium Term Fiscal Strategy of 2013-2016 the target for primary surplus was 4.5 percent of GDP in 2016 (Τράπεζα της Ελλάδος).

In November 2012, the Eurogroup approved the amendment of the terms of the programme, including a wide range of far reaching measures in the areas of fiscal consolidation, structural reforms, privatisation and financial sector stabilisation. The Eurogroup noted that all prior actions required to that point had been met in a satisfactory manner and also commended the considerable efforts made by the Greek authorities and citizens. Furthermore, progress was made in identifying a consistent package of

credible initiatives aimed at making a further substantial contribution to the sustainability of Greek government debt (Eurogroup, Statement by the Eurogroup President, Jean-Claude Juncker). Greece had also significantly strengthened the segregated account used for debt service. It was agreed that the country would transfer all privatizations revenues, the targeted primary surpluses, as well as 30 percent of the excess primary surplus to this account, to meet debt service payment on a quarterly forward-looking basis. Moreover, Greece committed to increase transparency and provide full ex ante and ex post information to the EFSF/ESM on transactions on the segregated account (Eurogroup, Eurogroup statement on Greece).

However, the outlook for the sustainability of Greek government debt had worsened compared to March 2012 when the second programme was concluded. This was mainly a result of the deteriorated macro-economic situation and the constant delays in programme implementation. Thus, the Eurogroup decided that the revision in the fiscal targets was critical and postponed the primary surplus target of 4.5 percent of GDP from 2014 to 2016. Moreover, a debt reduction was discussed, involving public debt tender purchases of the various categories of sovereign obligations in the near future. This was completed by December 2012, with the repurchase of public debt of nominal value €31.9 billion on 33.8 percent of its nominal value.

After the reassurance of the Greek authorities on their willingness to carry the fiscal and structural reform momentum forward, the Euroarea Member States agreed to gradually undertake other favourable measures to control the debt dynamics. They also committed that further positive measures and assistance would be considered when Greece would achieve a primary surplus, subject to the implementation of all the terms of the programme, in order to ensure that by the end of the IMF programme in 2016, Greece would reach a debt-to-GDP ratio of 175 percent and in 2020 of 124 percent of GDP, and in 2022 a debt-to-GDP ratio substantially lower than 110 percent (Eurogroup, Eurogroup statement on Greece). The Eurogroup concluded that the necessary elements were in place for Member States to launch the relevant national procedures required for the approval of the next EFSF disbursement, which amounts to €43.7 billion, €10.6 billion for budgetary financing and €23.8 billion in EFSF bonds earmarked for bank recapitalisation will be repaid in December (Eurogroup, Eurogroup statement on Greece).

This progress assisted the stabilization of the economy in late 2012. The 2012 financial data also suggested improvement, despite all the negative factors, the great recession (-6.4 percent) continued in 2012. In detail,

the general government deficit fell to 5.8 percent of GDP, the primary deficit to 0.8 percent (excluding the impact of the support of financial institutions, amounting to 3.2 percent of GDP) and debt in 156.9 percent of GDP (Τράπεζα της Ελλάδος).

At the beginning of 2014 there were strong evidence that the situation was improved during 2013 and that the economy was now more stable; the recovery of the Greek economy had started. This was achieved, despite the crisis in Cyprus at the beginning of 2013 that rekindled worries and uncertainty about the Greek banking system and economy in general.

2013 was a milestone year for many reasons. Fiscal consolidation has impressively progressed and a primary surplus was recorded in 2013 after a long period of large deficits.[2] Surplus was recorded for the current account as well, for the first time in years. This development was largely due to the reduction of imports, however, in the meantime there was a significant recovery in receipts from tourism services and increased revenues from exports of goods. Furthermore, the rate of depression was expected to decline to about 4 percent in 2013, while it finally stood slightly lower (-3.85 percent). This indicates that the recession was milder compared to both 2012 and the initial forecast for 2013. (Τράπεζα της Ελλάδος)

Domestic and foreign expectations were improved and gradually confidence was restored. There were some favorable developments in the real economy, according to some indicators of both production and the labour market (Τράπεζα της Ελλάδος). At the same time, spreads of Greek bonds over German fell to the 2010 level, while on November 30 the first credit rating upgrade of the Greek Government of two notches was realized,[3] (by rating agency Moody's). Additionally, a positive development for investment was the announcement that the Adriatic gas pipeline (TAP) that transports natural gas from Azerbaijan would pass through Greece, Italy and the rest of Western Europe. Simultaneously, the privatization program was progressing, after the significant delays of the previous years, and during 2013 significant privatizations (OPAP, DESFA, etc.) took place, attracting foreign capital. (Τράπεζα της Ελλάδος)

[2] According to the Bank of Greece, the structural primary balance improved by 19 bps of potential GDP in the period 2010-2013 and thus, turned into a surplus of about 4.4 percent of potential GDP at the end of 2013. This improvement is particularly important as it is considered to be one of the largest internationally achieved in the field of fiscal consolidation, even though it was based on taxation on a higher-than-suggested degree, which led to a considerable burden on taxpayers and reduced the disposable income.

[3] By C to Caa3.

In 2013, for the first time after more than 45 years, negative inflation was recorded. This suggested that prices began to reciprocate the reduced demand and labour costs and contributed to the support of the real disposable income. However, its continuation for a long time was adjudged non-beneficiary, as the deflation amplifies uncertainty in the economy and in business expectations and exacerbates the dynamics of public debt. (Τράπεζα της Ελλάδος)

Progress was made in the restructure of the economy from the supply side, albeit in a slow pace. However, adjustment in relative prices created incentives for reallocation of resources from the production of non-tradable goods to the production of internationally tradable goods, where productivity is much higher. The continuation and strengthening of this policy was expected to lead to an increase in the overall productivity in the medium term, to the enhancement of competitiveness and to the creation of new jobs. (Τράπεζα της Ελλάδος)

Finally, the recapitalization of credit institutions was promoted and the structure of the banking sector was changed drastically. This created robust banks able to take advantage of economies of scale. The reclassification and restructuring of the banking system happened in a smooth way, without any depositor suffer impairment of deposits, i.e. without disrupting financial stability. (Τράπεζα της Ελλάδος)

A main target during 2013 was the increase of the tax revenues with amendments in the tax system, such the inclusion of the new Single Property Tax (ENFIA). Furthermore, an advanced control of expenditure was applied, by invigorating the monitoring mechanisms for the proper implementation of the approved budgets at all government levels. Additionally, efforts were made to restructure public organizations and enterprises (e.g. ERT ELVO, EAS, LARKO). Moreover, the 2013 recapitalization and restructuring of the banking system formed a new banking picture in Greece, with fewer in number but stronger banks, which were expected to ease the liquidity issues encountered in the economy. In the short-term, however, due to many negative factors, origination (of loans) remained very limited.

Every financial crisis has great consequences on the wellbeing of the population. To explain and analyse the socioeconomic impact the 2008-2013 part of the ongoing crisis had to the people of Greece, and to create an econometric analysis later on, we need to take into account two factors that characterise the wellbeing of the population. These are poverty and inequality. Before continuing, we need to establish the definitions of

these two factors, as throughout economic research various different approaches have been made.

3. Methodological Issues on Poverty and Inequality Analysis

There are various definitions and aspects of wellbeing; in this study we refer and focus on poverty and inequality analysis and measurement in the international literature, as these are fundamental for "cognitive, analytical, policymaking, monitoring and evaluation purposes" (Coudouel, Hentschel and Wodon). This analysis offers the ability to researchers and analysts to apprehend the nature of a situation and the factors determining it, to design optimal interventions for any faced issues, as well as to evaluate the effectiveness of implemented policies and to determine whether the situation is changing (Coudouel, Hentschel and Wodon).

What is typically referred as poverty is the situation where households or individuals do not possess enough resources or abilities to meet their current needs (Coudouel, Hentschel and Wodon). This is a definition based on the comparison between individuals' or households' income, consumption, education or other attribute. There is also a defined threshold, e.g. a poverty line, under of which the individual or the household is considered poor. Further analysis follows in Section 3.1.

Inequality in the distribution of income, consumption, or any other attribute across the population is based on the hypothesis that "the relative position of individuals or households in society is an important aspect of their welfare" (Coudouel, Hentschel and Wodon). There also holds another assumption; a similarly important indicator of the level of welfare in a country, region or population, is the overall level of inequality in monetary and nonmonetary terms in the particular group (Coudouel, Hentschel and Wodon).

As already mentioned there are numerous dimensions of wellbeing and thus, multiple tools to "measure" it, e.g. income, consumption, education, health, assets ownership etc. Traditionally, monetary measures are used to value household welfare. The two most obvious candidates are income and expenditure/consumption. There are both conceptual and reporting reasons why one might prefer either consumption or income data when examining the level of changes in the material wellbeing. The conceptual issues "strongly favor consumption, while reporting issues tend to favor income for most people, but not for low-resource populations" (Meyer and Sullivan). The main advantage of income is that it is "generally easier to report and is

available for much larger samples, providing greater power to test hypotheses" (Meyer and Sullivan). On the other hand, consumption is more likely to capture a family's long-term prospects and actual standard of living and ability to meet basic needs than income (Cutler and Katz). Additionally, people may be reluctunt to disclose the full extend of the income they earn, lest the tax collector or, for instance, in case it was earned illigaly. Even so, consumption is likely to be systematically understaded, as it is difficult to ask the "right questions". When the questions are more detailed, respondents are likely to remember in more detail and to report higher spending. Nevertheless, for the scopes of this study and regarding the nature of the dataset used, income was selected as the preferred measure.

3.1. Poverty Concept and Analysis

According to Coudouel, Hentschel and Wodon, the main ingredients required to compute a poverty measure are three. As they mention in "Poverty Measurement and Analysis", one has first to choose the relevant dimension and indicator of wellbeing. Second, one has to select a poverty line, absolute or relative. Finally, a poverty measure has to be selected for reporting for the population as a whole or for a population subgroup only.

According to UNESCO and in pure economic terms, income poverty is when "a family's income fails to meet a federally established threshold, that differs across countries" (UNESCO). This is usually measured with respect to households and not individuals and then is adjusted for the number of persons in the household.

Poverty can be defined in either relative or absolute terms. "Absolute poverty measures poverty in relation to the amount of money necessary to meet basic needs such as food, clothing and shelter" (UNESCO); for example, the poverty line could be set at 60 percent of a country's mean income. However, the definition in absolute terms neglects, i.e. does not take into account the important social and cultural needs of individuals. Therefore, the concept of relative poverty was developed; "relative poverty defines poverty in relation to the economic status of other members of the society" (UNESCO). People are considered poor if they fall below the threshold of standards of living "in a given societal context" (UNESCO). For monetary measures, the measurement could be based on, e.g. the cost of a nutritional basket considered minimal for the health of a typical family, with non-food needs added (Coudouel, Hentschel and Wodon).

Individuals are influenced by the physical and cultural context in which they live. Hence, a part of social scientists that studied poverty, contributed into its understanding, with the so-called "free choice models" (UNESCO). The main idea is based on personal responsibility; individuals are able with their actions to control their own destiny and are thus the cause of their own poverty (UNESCO) (Roemer). Sociologists mostly researched the reasons for poverty instead of ways to measure it, e.g. the roles of culture, power, social structure and other factors largely out of the control of the individual. Therefore, there is a need to understand the multidimensional nature of poverty, in order to create more effective programs for poverty alleviation (UNESCO).[4]

3.2. Poverty Measurement

There are a few families of axioms that a poverty measure is desired to satisfy. Initially, there are "Focus axioms", that require a poverty index to be insensitive to incomes above the poverty line (Bellù and Liberati, Impacts of Policies on Poverty: Axioms for Poverty Measurement). This is a natural consequence of the fact that only people below the poverty line count in poverty analysis. Therefore, poverty indices are not concerned about what happens above the poverty line. There are two versions of this axiom, according to the analysis of Bellù and Liberati:

Standard focus axiom (F) - The poverty index measured in two same size income distributions with the same income of the poor, should give the same value.

Generalised focus axiom (GF) – The poverty index measured in two different size income distributions with the same income of the poor, should give the same value.

Furthermore, there are "Monotonicity axioms", requiring that if the income of a poor individual who is below the poverty line increases, then the poverty index should decrease. There are two versions:

Strong monotonicity axiom (SM) – A rise in the income of a poor individual, should cause a decrease of the poverty index.

Weak monotonicity axiom (WM) – A rise in the income of a poor individual should cause a decrease of the poverty index provided that this individual remains poor.

[4] Further analysis follows, with referral to the Multidimensional Poverty Index (MPI).

According to the analysis of Bellù and Liberati, the increase of a poor individual income according to WM the poverty index should decrease only if the individual is still considered poor after the increase. Furthermore according to SM if an individual is lifted out of poverty, there should be a decrease in the poverty index. Therefore, SM implies WM.

Additionally to these axioms, there are the "Transfer axioms". They require a poverty measure to decrease after a progressive transfer and to increase after a regressive transfer (Bellù and Liberati, Impacts of Policies on Poverty: Axioms for Poverty Measurement). Four versions of this simple principle can be identified.

Minimal transfer axiom (MT) – A progressive (regressive) transfer between two poor individuals should cause a decrease (increase) in the poverty index given that there is no change in the number of the poor people due to the transfer (i.e. both individual remained poor after the transfer).

Weak transfer axiom (WT) – A progressive (regressive) transfer among an individual to a relatively poorer individual -either above or below the poverty line - should cause a decrease (increase) in the poverty index given that there is no change in the number of the poor people due to the transfer.

Strong upward transfer axiom (SUT) – A progressive (regressive) transfer between two individuals when the poorer of the two is poor both before and after the transfer and the richer maybe either above or below the poverty line as a result of the transfer, should cause a decrease (increase) in the poverty index.

Strong downward transfer axiom (SDT) – A progressive (regressive) transfer from a relatively richer person, who may or may not be poor, to a poor person who may become non-poor after the transfer, should cause a decrease (increase) in the poverty index.

As described above, MT requires that there no individual involved is above or crosses the poverty line before or after the transfer. WT requires that the recipient of the transfer has to be below the poverty line before and after the transfer and the donor may be below or above but cannot cross the line. SUT allows the donor to cross the poverty line, but the other party must remain below the poverty line. SDT allows both individual to cross the poverty line but not both.

Finally, the "Symmetry axioms" that include scale invariance, translation invariance and the principle of population.

Scale invariance (SI) or relative poverty index – This axiom requires the invariance of the poverty index if the same factor is used to scale both all incomes of poor individuals and the poverty line.

Translation invariance (TI) or absolute poverty index – This axiom requires the invariance of the index, when the poverty line and the poor income be increased (or decreased) by the same absolute amount.

Principle of population (PP) or Size Independence Axiom (SIN) – This axiom requires the invariance of the poverty index when identical populations are replicated and pooled.

Axioms discussed above help to efficiently choose among the poverty measures that one will select based on its desirable characteristics along with each context.

"There is no single poverty measure that respects all axioms at the same time" (Bellù and Liberati, Impacts of Policies on Poverty: Axioms for Poverty Measurement).

In order to choose the desirable measure, one has to prioritise the properties of the axioms discussed above, which is difficult. However, the transfer axioms are considered of high importance as they measure sensitivity of income transfers.

The context of the section below, discusses various poverty measures along with the axioms they satisfy and their importance in the economic theory and research.

In "Poverty Measurement and Analysis", Coudouel, Hentschel and Wodon define poverty measures as statistical functions that translate the comparison of the indicator of household wellbeing and the chosen poverty line into one aggregate number for the population as a whole or a population subgroup. Since there are many poverty measures, what follows is an attempt to present and describe the most commonly used.

3.2.1. Headcount (Incidence of poverty) Index (HC)

For monetary indicators, this is the share of the population whose income (or consumption) is below the poverty line; it therefore measures the proportion of the population that is poor. Similarly, for nonmonetary indicators the incidence of poverty measures the share of the population that does not reach the defined threshold (for instance, the percentage of the population with less than three years of education). (Coudouel,

Hentschel and Wodon) This is popular because it is easy to understand and measure. However, it does not take the intensity of poverty into account and does not indicate how poor the poor are.

Formally, following the analysis in "Introduction to Poverty Analysis" by the World Bank Institute,

$$P_0 = \frac{N_p}{N}$$

where P_0 is the proportion of the population that is counted as poor, N_p is the number of poor and N is the total population (or sample). For reasons that will become clear below, it is often helpful to rewrite as follows:

$$P_0 = \frac{1}{N}\sum_{i=1}^{N} I(y_i < z),$$

where $I(y_i < z)$ is an indicator function that takes on a value of 1 if the bracketed expression is true and 0 otherwise. Therefore, if expenditure y_i is less than the poverty line z, then I equals to 1 and the household would be counted as poor.

3.2.2. Poverty gap (Depth of poverty) Index (PG)

This measure indicates the extent to which individuals fall below the poverty line (the poverty gaps) as a proportion of the level of the poverty line (Khandker and Haughton). It captures the mean aggregate income or consumption shortfall relative to the poverty line across the whole population. It is calculated by adding up all the shortfalls of the poor (assuming that the non-poor have a shortfall of zero) and dividing the total by the population. The sum of these poverty gaps gives the minimum cost of eliminating poverty, if transfers were perfectly targeted. In other words, it estimates the total resources needed to bring all the poor to the level of the poverty line and one may think of it as the "cost of eliminating poverty". This index, though, does not reflect changes in inequality among the poor.

One can define the poverty line G_i as follows:

$$G_i = (z - y_i)I(y_i < z),$$

and thus, the poverty gap index may be formally defined as:

$$P_1 = \frac{1}{N}\sum_{i=1}^{N} \frac{G_i}{z}.$$

Therefore, the minimum cost of eliminating poverty using targeted transfers is the sum of all the poverty gaps in the population/sample; every gap is filled up to the poverty line (Khandker and Haughton).

This measure can also be used for nonmonetary indicators, provided that the measure of the distance is meaningful; e.g., the poverty gap in education could be the number of years of education needed or required to reach a defined threshold.

3.2.3. Squared Poverty Gap (Poverty severity) Index

This measure "takes into account not only the distance separating the poor from the poverty line (the poverty gap), but also the inequality among the poor" (Coudouel, Hentschel and Wodon). That is, a higher weight is placed on those households that fall well below the poverty line. The same limitations apply for some of the nonmonetary indicators, as well as the poverty gap measure.

This is a weighted sum of poverty gaps (as a proportion of the poverty line), where the weights are the proportionate poverty gaps themselves; i.e. a poverty gap of (say) 20 percent of the poverty line is given a weight of 20 percent. This is in contrast with the poverty gap index, where the weights are equal. Therefore, by squaring the poverty gap index, the measure implicitly puts more weight on observations falling further away from the poverty line. Formally:

$$P_2 = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{z}\right)^2.$$

Howbeit, this measure "lacks intuitive appeal and since it is not easy to interpret it is not used very widely" (Khandker and Haughton).

3.2.4. The FGT Indices

All the aforementioned indices may be thought of as parts of a family of measures proposed by Foster, Greer and Thorbecke in "A Class of Decomposable Poverty Measures", which is formally formulated as follows:

$$\mathrm{P_a} = \frac{1}{\mathrm{N}}\sum_{\mathrm{i=1}}^{\mathrm{N}}\left(\frac{\mathrm{G_i}}{\mathrm{z}}\right)^{\mathrm{a}}, \quad (\mathrm{a} \geq 0),$$

where a is a measure of the sensitivity of the index to poverty and the rest of notations has been already defined. When $\mathrm{a} = 0$, $\mathrm{P_0}$ is simply the headcount index. For $\mathrm{a} = 1$ and a = 2, P equals to the PG index and squared

PG index respectively, then is the squared poverty gap index. For all $a > 0$, this index is decreasing along with the living standard of the poor – the lower the standard the poorer you are. For a > 1 the index is sensitive to the amount of deviation below the poverty line, and thus the poorer an individual is, the greater the impact of a fall in the standard of living. The measure is then said to be "strictly convex" in incomes (and "weakly convex" for $a = 1$). Another convenient feature common to the FGT class of poverty measures is that they can be disaggregated for population sub-groups and the contribution of each sub-group to national poverty can be calculated. (Foster, Greer and Thorbecke)

Even though the FGT measure offers an "elegant unifying framework" for measures of poverty, the question of what is the best value of a, is left unanswered (Khandker and Haughton). Additionally, some of these measures "lack emotional appeal" (Khandker and Haughton). As Khandker and Haughton mention, the measures of poverty depth and severity add complementary information on the incidence of poverty. Some groups may have a high poverty incidence but low poverty gap (when numerous members are just below the poverty line), while other groups may have a low poverty incidence but a high poverty gap for poor members (when relatively few members are below the poverty line but with extremely low levels of income/consumption).

3.2.5. The Sen Index

Sen proposed in his paper "Poverty: an ordinal approach to measurement" an index in order to combine the effects of the number of poor, the depth of their poverty, and the distribution of poverty within the group. The index can be formally formulated as follows:

$$P_S = P_0(1 - (1 - G^P)\frac{\mu^P}{z},$$

where P_0 is the headcount index, μ^P is the mean income of the poor and G^P is the Gini Coefficient of inequality among the poor (Sen, Poverty: An Ordinal Approach to Measurement).[5] The Sen Index may also be formulated as the average of the headcount and poverty gap measures, weighted by the Gini Coefficient of the poor, giving:

$$P_S = P_0 G^P + P_1(1 - G^P).$$

The Sen Index has been widely discussed in literature. It has the distinctive advantage of taking into account the income distribution among

[5] The Gini coefficient ranges from 0 to 1 (perfect equality to perfect inequality) and is discussed later on.

the poor. However the index is almost never used outside of the academic literature, "perhaps because it lacks the intuitive appeal of some of the simpler measures of poverty" (Khandker and Haughton) but also because it "cannot be used to decompose poverty into contributions from different subgroups" (Deaton). The Sen Index has also been modified by others, with the most convincing altered version being the Sen Shorrocks Thon index (SST), formally formulated as:

$$P_{SST} = P_0 P_1^P (1 + \widehat{G}^P),$$

which is the product of the HC Index, the PG Index (*applied to the poor only*), and a term with the Gini Coefficient of the poverty gap ratios (i.e. of the *Gn*'s) *for the whole population*. This Gini Coefficient typically is close to 1, indicating great inequality in the incidence of poverty gaps. (Khandker and Haughton)

3.2.6. Other Poverty Indices and Axioms' Satisfaction Overview

There are many other indices in the international literature with various characteristics, such as the Watts Index that was the first distribution-sensitive poverty measure, proposed in 1968 by Watts (Zheng), or the Multidimensional Poverty Index (MPI), which was published for the first time in the 2010 UNDP report. The MPI shows the number of people who are multi-dimensionally poor (suffering deprivations in 33 percent or more of weighted indicators) and the number of deprivations with which poor households typically contend with (United Nations Development Programme).

As discussed in this section above, none of the poverty indices respects all axioms at the same time. Axiom's violations for the poverty indices are shown in the synthesis below (Bellù and Liberati, Impacts of Policies on Poverty: Axioms for Poverty Measurement).

Axioms' Satisfaction Synthesis	***HC***	***PG***	***S***	***FGT***
Focus				
Focus (FO)	Yes	Yes	Yes	Yes
Generalised Focus (GF)	No	Yes	No	No
Monotonicity				
Strong (SM)	Yes	No	Yes	Yes, if a>0

Weak (WM)	No	Yes	Yes	Yes, if a>0
Transfer				
Minimal (MT)	No	No	Yes	No
Weak (WT)	No	Yes	Yes	Yes, if a>1
Strong upward (SUT)	No	Yes	No	No
Strong downward (SDT)	No	Yes	Yes	Yes, if a>1
Symmetry				
Scale Invariance (SI)	Yes	Yes	Yes	Yes
Translation invariance (TI)	Yes	No	No	No
Population principle (PP-SIN)	Yes	Yes	No	Yes

Table 1 - Axioms' Satisfaction Synthesis

where HC = Headcount, PG= Poverty Gap, S= Sen Index, FGT = FGT Index

(Bellù and Liberati, Impacts of Policies on Poverty: Axioms for Poverty Measurement).

As mentioned above it is necessary to choose the desirable properties to which the selected measure will adhere, as the violations as it can be seen are many.

3.3. Inequality Concept and Analysis

Inequality means different things to different people: whether inequality concerns ethical concepts or is construed as "unfairness", or simply means differences in income, it is the subject of much debate. In this study, we will conceptualise inequality as the dispersion of a distribution, whether that be income, consumption or some other welfare indicator or attribute of a population. Inequality is often studied as part of broader analyses covering poverty and welfare, although the three concepts are distinct. Inequality is a broader concept than poverty as it is defined over the whole population and not just over the part of the population that is below a certain poverty line. Incomes at the top and in the middle of the distribution may be just as important for the measurement of inequality as those at the bottom (Litchfield). Most inequality measures do not depend on

the mean of the distribution, which is something considered desirable for an inequality measure. Inequality measures are often calculated for distributions other than expenditure, e.g. for income, land, assets, tax payments, etc. Further analysis follows in the next section.
There is a classification made in literature between within-group and between-group inequality. Usually, at least three-quarters of measured inequality in a country is due to within-group inequality and the remaining quarter is attributed to between-group differences. Furthermore, it is often helpful to decompose inequality by occupational group or by source of income, in order to identify policies that would help moderate inequality.

3.4. Inequality Measurement

There are two approaches to treat the issue of inequality: the descriptive and the normative approach.

In the descriptive approach the analyst takes a picture of inequality as it is in state A and describes changes in income distribution under different scenarios, for instance, state B. However, he/she does not dispose of devices to state whether A is better than B or vice versa (Bellù and Liberati, Policy Impacts on Inequality: Inequality and Axioms for its Measurement). Descriptive indices are usually mathematical formulas and they have mathematical properties. There is a big variety of descriptive indices and a way to select one among them is by the axioms they satisfy.[6]

The normative approach "enables the analyst to compare income distributions in terms of «greater or lesser desirability», according to a priori value judgment" (Bellù and Liberati, Policy Impacts on Inequality: Inequality and Axioms for its Measurement). In other words, this approach implies specifying if inequality is "bad" or "good", how much is "bad" or "good", how much society gains or losses from it and how to compare individual incomes (Bellù and Liberati, Policy Impacts on Inequality: Inequality and Axioms for its Measurement).

In the normative approach, the specification of a Social Welfare Function (SWF) qualifies the inequality measure. Thus, the way that the SWF is specified determines the use of the inequality index. As in the case of the descriptive approach, there are desirable axioms that an SWF could satisfy. However, the main problem of using a normative approach is that there might be as many SWFs as the number of individuals in a society, reflecting subjective judgments (Bellù and Liberati, Policy Impacts on Inequality:

[6] Inequality axioms will be discussed later in this section.

Inequality and Axioms for its Measurement). Income inequality might therefore appear more or less severe depending on the SWF chosen.

Although various authors have suggested different sets of desirable properties for inequality indices, a rather general agreement seems to exist, that an index should satisfy the following axioms. The first one is the "Symmetry axiom", meaning that any modification of incomes should leave the index unaffected. Second is the "Income - unit independence axiom", that is, if the incomes of all population members change by the same proportion, the value of the index should remain unaffected. In addition, there is the translation invariance axiom, which means that income changes are distributionally neutral only if they occur in the same absolute amounts for all individuals in the income distribution (Bellù and Liberati, Policy Impacts on Inequality: Inequality and Axioms for its Measurement). Furthermore, there is the "Population - size independence axiom". This one suggests that if two or more identical populations are pooled, the value of the index should remain unaffected. Finally, the "Transfer axiom" states that a regressive transfer of income between two population groups that does not reserve their relative ranking should increase the index. (Tsakloglou, Measurement and Decomposition of Inequality by Population Subgroups: A Survey and an Example).

These axioms are generally accepted, however, they are controversial. It is suggested by some authors that the symmetry axiom may be undesirable, as it does not consider the process of income generation and the different circumstances faced by different populations (Sen, Personal utilities and public judgments: or what's wrong with welfare economics) (F. Cowell, On the structure of additive inequality measures). Regarding the income unit independence axiom, it implies that the Social Welfare Function underlying the inequality index should be homogeneous of degree one with respect to the vector of incomes, which may be controversial (Tsakloglou, Measurement and Decomposition of Inequality by Population Subgroups: A Survey and an Example). Literature has instead suggested that the value of the index should remain unaffected if there are additions of equal amounts to all incomes (Dalton). However, if an index violates the income-unit independence axiom the degree of inequality depends on the unit of measurement of income, which is generally unacceptable (Kakwani). The transfer axiom (also known in the literature as the "principle of transfers" or the "Dalton - Pigou condition") is considered by some authors as rather weak (Kakwani) (Sen, On Economic Inequality). They support that the impact on the index of a regressive transfer of a given amount of income should be greater if the transfer takes place at a lower income

level ("strong principle of transfers"). Additionally, doubts have been expressed about the desirability of the population - size independence axiom (F. Cowell, Measuring Inequality). Nevertheless, something undoubtedly desirable is the decomposability of a measure.
As already mentioned, there are multiple ways to measure inequality. The easiest way is to divide the population into quintiles or deciles from poorest to richest and report the levels of income/expenditure that attributes to each level (percentile ratios). This study will present a few of the main inequality indices.

3.4.1. The Absolute Income Gap (or Range of Dispersion)

An absolute income gap refers to the difference between separate groups in terms of actual income. However, even this gap is an understatement of the degree of income inequality in the economy, as it compares only the average income for poor and rich groups. If one compared the income of the poorest people in poor groups with the income of the richest people in rich groups, the absolute gap would be even wider (Thirlwall). It ignores information about incomes in the middle of the income distribution and does not even use information about the distribution of income within the top and bottom deciles (Khandker and Haughton).

This measure is scale invariant but not translation invariant nor does it satisfy the principle of transfers (Bellù and Liberati).

Similar to this logic are all the dispersion ratios, that calculate the ratio of the average income of the richest x percent of the population to the average income of the poorest x percent and expresses the income (or income share) of the rich as a multiple of that of the poor. A common ratio of this type is the 20/20 ratio, (or called as “income quintile ratio” by the United Nations Development Programme Human Development Report), which compares the ratio of the average income of the richest 20 percent of the population to that of the poorest 20 percent of the population (Development Policy and Analysis Division). Another measure broadly used is the decile dispersion ratio, which presents the ratio of the average income of the richest 10 percent of the population divided by the average income of the bottom 10 percent.

Other common dispersion ratios include D9/D5 (the ratio of the income of the 10 percent richest to the income of those at the median of the earnings distribution), D5/ D1 (the ratio of the income of those at the median of the earnings distribution to the 10 percent poorest), etc.

3.4.2. The Relative Income Gap

A relative income gap refers to the difference in income between groups in terms of the share of total income going to different groups. It is the ratio of the richest group (or groups) to the poorest group (or groups).

3.4.3. Standard Deviation

The third measure of inequality is a well-known statistic, standard deviation. This is the square root of the variance, which measures the average sum of the squared deviations of each group's income from the average (or mean) income for all groups. It is formally formulated as follows:

$$SD = \sqrt{\frac{\sum_{i=1}^{n}(Y_i - \bar{Y})^2}{n}},$$

where Y_i is the income of a particular group i, $\bar{Y}$ is the average level of income in the entire population and n is the number of groups. In the growth and development literature, movements in this ratio are referred to as sigma (σ) divergence or convergence (if the movements are upwards or downwards, respectively) (Thirlwall).

3.4.4. Coefficient of Variation

This is the standard deviation SD divided by the mean of the sample $\bar{Y}$. This normalises the standard deviation, as there is a positive correlation between the mean and the standard deviation (Thirlwall). The general formula is:

$$CV = \frac{1}{\bar{y}}\sqrt{\frac{\sum_{i=1}^{n}(Y_i - \bar{Y})^2}{n}}.$$

CV is a scale invariant measure but not translation invariant, that is by multiplying all incomes by a factor, this measure remains unchanged, but by adding an amount to all this measure decreases. Furthermore, this measure satisfies the transfer axiom, as redistributing incomes from richer individuals to poorer individuals reduces measured inequality (Bellù and Liberati).

3.4.5. Gini Index of Inequality

It is the most widely cited measure of economic inequality and is derived from the Lorenz curve, which is related to the distribution of income in relation to the distribution of population across groups. The Gini Coefficient measures the extent to which the distribution within an economy deviates from a perfectly equal distribution. One should keep in mind that there are three types of Gini ratios that can be computed. The first measures inequality between groups, where each group is treated as a single unit and it is given equal weight in the measure. In the second, each group is treated as a single unit, however is weighted by its size of sample. The third one takes into account not only differences in income between groups, but also differences between people within the groups; it takes the individual or the household as the unit of measurement, not the whole group (Thirlwall).

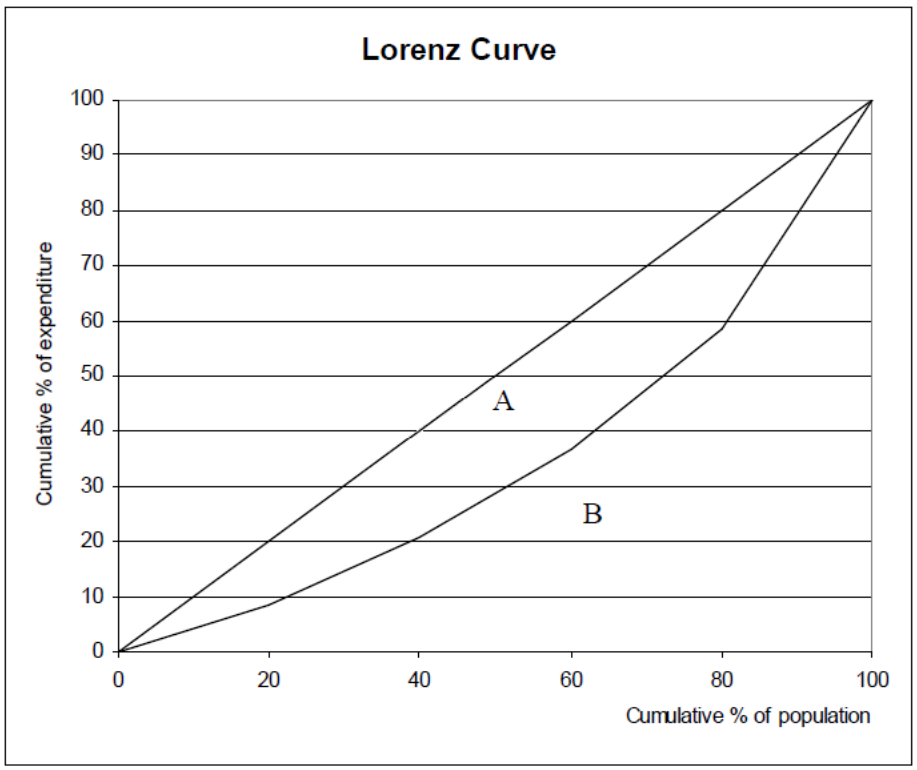

Figure 1 - Lorenz Curve

The diagonal 45-degree line indicates an equal distribution of income. The position of the Lorenz curve in relation to the 45-degree line, gives a visual impression of the degree of inequality; the closer the Lorenz curve is to the 45-degree line, the more equal the distribution, and vice versa. The Gini ratio is computed as the ratio of the area between the Lorenz curve and 45-degree line to the area beneath the 45-degree line. In the figure above, it is equal $A/(A+B)$. If the Lorenz curve is coincident with

the 45-degree line, the Gini ratio would be zero and the distribution would be considered as completely equal. The higher the Gini ratio, the more unequal the distribution of income in the population. According to World Bank data, between 1981 and 2013 the Gini ratio ranged between 0.3 and 0.6 worldwide (Khandker and Haughton).

Formally, let x_i be a point on the X-axis, and y_i a point on the Y-axis. Then:

$$Gini = 1 - \frac{1}{N}\sum_{i=1}^{N}(x_i - x_{i-1})(y_i + y_{i-1}).$$

When there are N equal intervals on the X-axis this simplifies to:

$$Gini = 1 - \frac{1}{N}\sum_{i=1}^{N}(y_i + y_{i-1}).$$

The Gini Coefficient satisfies the transfer axiom and is scale invariant, and stays the same in case of replication of the sample with different population, and thus is population independent. Nevertheless, it is not invariant to adding an amount to all units, i.e. it is not translation invariant. It allows direct comparison of two populations' income distribution, regardless of their size. However, there is a significant limitation; the Gini Coefficient is not easily decomposable or additive (Khandker and Haughton). In addition, "it does not respond in the same way to income transfers between people in opposite tails of the income distribution as it does to transfers in the middle of the distribution" and very different income distributions can present the same Gini Coefficient (Khandker and Haughton). It places a "rather curious implicit relative value" on changes occurring in different parts of the distribution (F. Cowell).

3.4.6. Atkinson's Index

This is one of the most popular welfare-based inequality measures. It presents the percentage of total income that a society would have to sacrifice in order to have more equal shares of income between its citizens. This measure depends on the degree of society aversion to inequality, which is represented in the general formula by the weighting parameter ε (that measures aversion to inequality), where "a higher value entails greater social utility or willingness by individuals to accept smaller incomes in exchange for a more equal distribution" (Development Policy and Analysis Division). The general formula is as follows:

$$A_\varepsilon = \begin{cases} 1 - \left[\frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\bar{y}}\right)^{1-\varepsilon}\right]^{1/(1-\varepsilon)}, & \varepsilon \neq 1 \\ 1 - \frac{\prod_{i=1}^{N} y_i^{(1/N)}}{\bar{y}}, & \varepsilon = 1. \end{cases}$$

An important characteristic of the Atkinson Index is that it can be decomposed into within- and between-group inequality. Additionally, unlike other indices, it can provide welfare implications of alternative policies and allows the researcher to include some normative content to the analysis (Bellù and Liberati, Policy Impacts on Inequality: Welfare Based Measures of Inequality – The Atkinson Index).

Atkinson Index is independent of income scale and population size (F. Cowell).

3.4.7. Theil Index and Generalized Entropy (GE) Measures

The values of the GE class of measures vary between zero (perfect equality) and infinity or, if normalized, between zero and one. A key feature of these measures is that they are fully decomposable, i.e. inequality may be broken down by, say, population groups or income sources, which may prove useful for policy-making scopes.

The general formulation of the GE measures is:

$$GE(a) = \begin{cases} \frac{1}{a(a-1)}\left[\frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\bar{y}}\right)^{a} - 1\right], & when\ a \neq 0, 1 \\ \frac{1}{N}\sum_{i=1}^{N} ln\left(\frac{y_i}{\bar{y}}\right), & when\ a = 0 \\ \frac{1}{N}\sum_{i=1}^{N} \frac{y_i}{\bar{y}} ln\left(\frac{y_i}{\bar{y}}\right), & when\ a = 1 \end{cases}$$

where $\bar{y}$ is the mean income. The parameter α is set by researchers in order to assign weight to gaps between incomes in different parts of the income distribution. For lower values of α, the measure is more sensitive to changes in the lower tail of the distribution and, for higher values, it is more sensitive to changes that affect the upper tail (Atkinson and Bourguignon). The most common values for α are 0, 1 and 2. When $\alpha = 0$, the index is called "Theil's L" or the "mean log deviation" measure. When $\alpha = 1$, the index is called "Theil's T" Index or, simply "Theil Index". When $\alpha = 2$, the index is called "Coefficient of Variation".[7] Similarly, to the Gini Coefficient when income redistribution happens, change in the indices depends on the level of individual incomes involved in the redistribution

[7] See formula in section 3.4.4 Coefficient of Variation.

and the population size (Bellù and Liberati, Describing Income Inequality: Theil Index and Entropy Class Indexes).

Theil Index is a scale invariant measure but not translation invariant, that is by multiplying all incomes by a factor, this measure remains unchanged, but by adding an amount to all this measure decreases. Furthermore, this measure satisfies the population unit independence axiom (Bellù and Liberati, Describing Income Inequality: Theil Index and Entropy Class Indexes).

3.4.8. Other Inequality Indices and Ratios

After the analysis of many indices, one should keep in mind that, nevertheless, a single statistic does not fully describe what is happening within a distribution, and, particularly, what is happening at the extremes of the distribution (Thirlwall). There are ratios of extremes, e.g. the income of the poorest 10 percent of, say, a country, compared with the richest 10 percent, that "can say as much, if not more, about income inequality and social justice than any integral measure" (Thirlwall).

II. Empirical - Econometrical Analysis

Among the scopes of this study is the measurement and decomposition of poverty and inequality in Greece during the current crisis. The years of interest are 2008 and 2013. The methodology used is explained below.

4. Methodological Issues

The dataset used in the empirical part of this study is obtained from the EU-SILC instrument[8], which is aiming at collecting timely and comparable cross-sectional and longitudinal multidimensional microdata on income, poverty, social exclusion and living conditions. Social exclusion and housing condition information is collected mainly at household (HH) level while labour, education and health information is obtained for persons aged 16 and over. The core of the instrument, income at very detailed component level, is mainly collected at personal level. Additionally, this dataset is chosen as it prioritizes the delivery of comparable, timely and high quality cross sectional data. EU-SILC focuses mainly on income. Detailed data are collected on income components, mostly on personal income, although a few household income components are included. However, information about social exclusion, housing conditions, labour, education and health information is also obtained.

Due to this reason and the reasons discussed in Section 3, the selected instrument for poverty and inequality measurement is income and the selected unit of analysis is mainly the individual/ household member and not households. This method was followed as, for instance, if 20 percent of households in a society are poor, it may be that 25 percent of the population is poor (if poor households are large) or 15 percent are poor (if poor households are small); the only relevant figures for policy analysis are those for individuals. However, as survey data are usually related to households, to measure poverty at the individual level one must make a critical assumption that all members of a given household enjoy the same level of wellbeing. This assumption may not hold in many situations, e.g. female or elderly members of a household, may be much poorer compared to other members of the same household (Khandker and Haughton).

Therefore: within each household, the individual with the highest income is set as the "household head". The difference in size and composition of each household makes their income comparison impractical due to the different needs. The methodology chosen to address this issue is the equivalised

[8] EU Statistics of Income and Living Conditions.

disposable income, i.e. the total income of a household, after tax and other deductions, that is available for spending or saving, divided by the number of household members converted into equalised adults; household members are equalised or made equivalent by weighting each according to their age, using the so-called modified OECD equivalence scale (Eurostat). Specifically the weights applied are the following: a weight of 1 to the household head, of 0.5 to each additional adult and 0.3 to each child. Then the total household disposable income is distributed accordingly.

Another necessary adjustment made to the original data before proceeding to measurement and decomposition of poverty and inequality is that all zero or negative incomes are given a value of one.

Regarding the measurement of poverty, both a relative and an absolute measure are used. At first, a relative poverty line set at 60 percent of median equivalised household disposable income is used, in order to assess individuals' living standards compared to the society's; an individual is considered poor when his income is not sufficient to ensure a standard of living compatible with the habits and standards of the given society he lives in. Additionally, an absolute poverty line at a constant level is used, to assess an individual's living standards compared to those he/she enjoyed a few years earlier. After the appropriate calculations, the relevant poverty line in 2008 is €6,456 and thus €538 per month and in 2013 is €5,028 and €419 per month respectively. Furthermore, the poverty line for 2013 is anchored at the 2008 level. All individuals (i.e. all household heads as mentioned above) below the poverty line are identified as poor.

The final choice concerns the poverty inequality indices that will be utilized. Many of these indices are discussed in the sessions above and have different sets of desirable properties. In this study, five indices are utilized (two for poverty and three for inequality measurement). Regarding inequality, the indices used are the Atkinson's Index with an epsilon of 0.5 and 1.0, the Theil Index for alpha equals zero, i.e. the mean log deviation[9], and the Gini Index of inequality.

4.1. Estimating the Distributional Impact of the Greek crisis – Poverty

Regarding poverty, the indices used are the HC ratio (poverty rate) as one of the most widely used measures and the FGT measure for alpha equals two, i.e. the average squared normalized poverty gap. For $FGT(a)$, the larger

[9] As they are considered decomposable measures.

alpha is, the greater the degree of "poverty aversion" (sensitivity to large poverty gaps).

Starting from the measurement and analysis of poverty, using the aforementioned poverty lines we calculate the results shown in Tables 2 and 3.

Initially, according to the HCR, in 2008 20.3 percent of the population was living under the poverty threshold, meaning 2,208,709 individuals receiving less than €6,456 per year. The situation deteriorated with the ongoing crisis, rising to a 22.9 percent of the population and thus, 2,505,319 individuals living under €5,028 per year, a threshold 22.12 percent smaller than the 2008 one. This poverty increase seems to be modest, however when examining poverty in absolute terms, it tells a different story. With the anchored 2013 poverty line, the situation appears to have deteriorated significantly. The considerably large 37 percent of the Greek population appeared to be poor, meaning 4,047,203 individuals were living under €6.456 per year. Similar results for the first years of the crisis are shown by Matsaganis M. in "The Greek Crisis: Social Impact and Policy Responses" (2013) and Mitrakos T. in "Inequality, Poverty and Social Welfare in Greece: Distributional Effects of Austerity" (2014).

All the indices included in the analysis for aggregate poverty (Table 2) show that poverty has raised between the years 2008 and 2013. The FGT indices, especially the FGT(1.5) and FGT(2.0), were the most sensitive to changes, with the FGT(2.0) indicating a rise in poverty up to 56.9 percent. Significantly sensitive as well were the Clark et all indices shown in the Table 2, as they indicate a rise between 2008 and 2013 in poverty up to 41.3 percent.

As already mentioned, measuring poverty while using an anchored poverty line for 2013, produces results that show an enormous change. HC ratio appears to be the less sensitive index and shows that poverty has risen by 82 percent, when the - still most sensitive ratio - FGT(2.0) shows a rise of 133.3 percent. Similarly, all the other indices indicate percentage differences of over 100 percent.

Aggregate Poverty	2008	2013	2013 anchored	% of change (2008-2013)	% of change (2008-2013 anchored)
Headcount ratio %	20,340	22,918	37,023	12,7%	82,0%
Index FGT(0.5) *100	10,104	12,861	20,520	27,3%	103,1%
Index FGT(1.5) *100	4,157	6,241	9,493	50,1%	128,4%
Index FGT(2.0) *100	3,106	4,873	7,246	56,9%	133,3%
Clark et al. index (0.25) *100	9,686	13,316	19,737	37,5%	103,8%
Clark et al. index (0.50) *100	7,785	10,995	16,729	41,2%	114,9%
Clark et al. index (0.75) *100	6,768	9,562	14,760	41,3%	118,1%
Sen index *100	8,815	12,035	18,656	36,5%	111,6%
Thon index *100	11,494	15,912	23,650	38,4%	105,8%
Takayama index *100	5,755	8,068	11,945	40,2%	107,6%

Table 2 - Aggregate Poverty

The results of measurement and decomposition of poverty are reported in Table 3. The decomposition of poverty is achieved with reference to a set of factors. These factors are demographic (sex, sex of HH head, age and HH size), regional (region according to NUTS 2 classification), occupational (self-defined current economic status) and educational (according to ISCED levels). Estimates of HCR and FGT(2.0) are reported for all the socioeconomic groups on both survey years along with the population share, the mean equivalised disposable income in relative terms and the contribution of each of these groups to poverty. All the analysis below is based on the use of relative poverty lines equal to €6,456 for 2008 and €5,028 for 2013.

The impact of the crisis on poverty by population subgroup has been uneven. When the population is segregated according to sex, both poverty indicators used for the measurement, HC Index and FGT(2.0), show a rise in poverty especially for women (circa 3 percent). Females contribute almost 52 percent in poverty. When testing for the gender of the HH head there are multiple observations one could make. Initially, most of the HHs are headed by men (85.5 percent), nevertheless, during the five first years of the crisis the population share of the HH headed by women rises by 3 percent. Another observation is that HHs headed by women receive less than the mean equivilased disposable income and the indices show higher poverty. Especially in 2013, the HC ratio shows that poverty for women has risen to 28 percent, implying a growth of 6 percent compared to the relevant percentage of 21.8 for male-headed HHs (growth less than 2 percent). In the literature, this phenomenon is also called as feminization of poverty (Tsakloglou, Aspects of poverty in Greece), as the HHs with female heads seem to be more affected by poverty; those HHs are poorer than the ones headed by males and become even poorer during the years of the crisis.

Female headed HHs do not seem to contribute a lot in poverty - howbeit, this is a result of their low percentage population share, even though this has changed over the years showing a rise of 3.3 percent.

With respect to age, relative poverty seems to have fallen drastically for the elderly to 15 percent, while it has risen for all the other groups, especially for people at their thirties and younger at almost 30 percent for both groups. This result is indicated by both indices in this analysis. This is a consequence of the very high unemployment for the youth, as mentioned in Section 2, and is reflecting the impact of job losses and income losses for people of working age. As expected after these results, the contribution the elderly had to poverty is significantly diminished, while the exact opposite effect takes place for the first two age groups. A second observation that should be made is the emerging rise of child poverty (children aged 15 or less), as the percentage of the latter living below the relative poverty line rose by 5.3 percent, reaching 27.9 percent in 2013 from 22.7 in 2008. According to a report published by Eurostat based on data from the EU-SILC survey, in the EU27 children are at greater risk of poverty or social exclusion than the rest of the population (Eurostat).

With respect to the HH size, results are mixed. However, the indices show decreasing poverty and contribution to poverty for HHs consisted of one or two members and increasing poverty for HHs of more members. Specifically there is an acute increase of poverty for HHs of three and four members. This can be partly explained by taking into account that many HHs consisted of one or two members usually older people and/or retired, as shown in Table 3. This is considered to be a factor indicating lower poverty, as discussed later in this section. Important contribution to this view, adds the aging of population, furtherly supporting the argument that many of the observed individuals in the first two groups are older and retired. Moreover, the mean equivalised disposable income in relative terms they receive seems to be greater in 2013, supporting the discussed argument (for being inactive as retired, as the mean equivalised disposable income in relative for retired individuals is significantly higher in 2013) and establishes why the contribution of those groups to poverty is reduced. On the other side, families with three or four members usually consisted of at least one young person that, as was mentioned, suffered the largest poverty increase, income and job losses during the crisis.

Relevantly to the analysis for the composition of the HHs, the analysis for the labour market status of each individual shows to the same direction. It

is already mentioned that the retired individuals appear to be the favoured ones in this situation, with an increase in the mean equivalised disposable income they receive in relative terms, (0.94 of the mean equivalised disposable income in 2009 levels to 1.08 mean equivalised disposable income in 2013 levels) and a reduced poverty rate by a solid 37 percent, resulting to a poverty rate of 12.5 percent in 2013. The absolute opposite is observed for unemployed individuals, for which the poverty rate has increased up to the catastrophic poverty rate of 44.8 percent, while at the same time their population share has significantly increased from 4.7 percent to 15.5 percent. Regarding the employees and as a result of the very large unemployment rates, the population share for those working full time has decreased by 12.4 percent to 32.7 percent of the Greek population. Their mean equivalised disposable income in relative terms has slightly rose and this is probably explained by the fact that the rise in poverty seems to have left certain categories unaffected, such as banking employees and public sector workers (Matsaganis, The Greek Crisis: Social Impact and Policy Responces).

With respect to the location, relative poverty has increased sharply in Attiki, Crete and Northern Greece, however, for slightly different reasons. Northern Greece and Crete are mostly rural areas and historically, rural areas are poorer than the urban ones (Tsakloglou, Aspects of poverty in Greece).[10] Howbeit, one would then wonder why poverty rate in Attiki has increased steeply. As Attiki represents almost 40 percent of the Greek population and is an urban area, it can be argued that the huge increase in youth unemployment affected the area vastly. Many young people are located in Northern Greece as well, explaining part of the big increase in the poverty rates, along with the increased contribution to poverty.[11]

Finally, with respect to the education level of the individuals, one can observe a decrease in the population shares of the lower education groups, due to aging of population. As the years pass, less people do not obtain appropriate educational level and there is easier access to the good of education. As expected, people included in the lower education groups obtain less than the mean equivalised disposable income in relative terms - however, there is a rise to the proportion of the average income they receive. This can be explained as a part of the argument concerning the aging of population and retired individuals that was analysed earlier.

[10] The degree of urbanization is included in geographical-area data.

[11] Particularly, calculation in the dataset indicated that in 2013 approximately the 38 percent of individuals younger than 30 were living in Attiki, while the 31 percent of the same age group was living in Northern Greece.

Moreover, individuals having attained secondary education level faced sharply increasing poverty, as many of them lost their jobs because of the crisis. Additionally, one would expect to find a strong negative correlation between poverty rate and level of education - and this is depicted in Table 3. This is in line with the findings of similar studies (Tsakloglou, Aspects of poverty in Greece). More specifically, in both years poverty was almost unknown to university graduates (first or second stage of tertiary education), relatively low among persons with post-secondary/ non-tertiary education completed and very high among persons with education lower than this level.

Population Group		Population Share		Mean Equivalised Disposable Income		Poverty Rate (HC)		Contribution to poverty - HC		FGT(2.0)		Contribution to poverty - FGT(2.0)	
		2008	2013	2008	2013	2008	2013	2008	2013	2008	2013	2008	2013
Gender	*Males*	49,2%	49,2%	1,01	1,02	19,9%	22,2%	48,0%	47,7%	3,154	4,774	50,0%	48,2%
	Females	50,8%	50,8%	0,99	0,98	20,8%	23,6%	51,9%	52,3%	3,059	4,968	50,0%	51,8%
	GREECE	100,0%	100,0%	1,00	1,00	20,3%	22,9%	100,0%	100,0%	3,106	4,873	100,0%	100,0%
Gender of Head	*Male Headed HH*	85,5%	82,2%	1,01	1,02	20,0%	21,8%	83,9%	78,3%	3,081	4,608	84,8%	77,7%
	Female Headed HH	14,5%	17,8%	0,92	0,90	22,6%	28,0%	16,1%	21,7%	3,253	6,097	15,2%	22,3%
	GREECE	100,0%	100,0%	1,00	1,00	20,3%	22,9%	100,0%	100,0%	3,106	4,873	100,0%	100,0%
Age	*Children (age ≤15)*	15,4%	16,5%	0,99	0,93	22,7%	27,9%	17,2%	20,2%	3,581	7,215	17,8%	24,5%
	15-29	17,5%	15,6%	0,98	0,88	20,8%	30,1%	17,9%	20,5%	3,316	6,434	18,7%	20,6%
	29-44	23,3%	22,7%	1,04	1,07	18,3%	21,6%	21,0%	21,3%	3,211	5,017	24,1%	23,4%
	44-64	25,5%	26,6%	1,07	1,05	18,9%	22,2%	23,7%	25,8%	3,327	5,020	27,4%	27,4%
	Age≥65	18,3%	18,6%	0,88	1,00	22,6%	15,1%	20,2%	12,3%	2,058	1,086	12,1%	4,1%
	GREECE	100,0%	100,0%	1,00	1,00	20,3%	22,9%	100,0%	100,0%	2,730	4,671	100,0%	100,0%
HH size	*Member: 1*	20,1%	25,7%	0,92	1,00	25,4%	22,4%	24,8%	27,5%	4,089	3,900	26,4%	23,7%
	Members: 2	28,2%	29,5%	1,03	1,12	18,7%	13,8%	25,6%	19,5%	2,142	2,754	19,4%	19,2%
	Members: 3	21,1%	19,8%	1,05	1,11	17,3%	19,1%	17,7%	18,1%	3,344	3,704	22,6%	17,4%
	Members: 4	27,3%	15,5%	1,00	0,98	20,7%	27,2%	27,4%	20,1%	3,202	6,319	28,0%	23,2%
	Members: 5	2,4%	6,9%	0,93	0,76	24,6%	31,0%	2,9%	10,2%	3,021	6,595	2,4%	10,8%
	Members: 6 or more	0,9%	2,7%	0,74	0,72	36,3%	35,2%	1,6%	4,6%	4,182	8,969	1,2%	5,8%
	GREECE	100,0%	100,0%	1,00	1,00	20,6%	20,9%	100,0%	100,0%	3,116	4,221	100,0%	100,0%
Area	*Northern Greece*	32,0%	31,1%	0,87	0,87	13,3%	24,7%	20,9%	33,5%	4,055	5,265	41,8%	33,6%
	Central Greece	20,1%	21,3%	0,92	0,91	27,0%	25,4%	26,7%	23,5%	3,368	5,494	21,8%	24,0%
	Attiki	37,9%	37,4%	1,16	1,18	18,6%	19,9%	34,8%	32,4%	2,515	4,308	30,7%	33,1%
	Southern Aegean & Crete	10,0%	10,2%	0,98	0,93	16,5%	23,7%	8,1%	10,6%	1,781	4,454	5,7%	9,3%
	GREECE	100,0%	100,0%	1,00	1,00	20,3%	22,9%	100,0%	100,0%	3,106	4,873	100,0%	100,0%

Labour Market Status	*Sum Employee working full-time*	45,1%	32,7%	1,15	1,29	14,3%	11,5%	32,6%	17,5%	2,360	0,020	36,5%	15,1%
	Sum Employee working part-time	4,3%	4,4%	0,83	0,82	27,4%	30,6%	5,9%	6,2%	3,367	0,061	4,9%	6,2%
	Unemployed	4,7%	15,7%	0,76	0,67	31,6%	44,8%	7,6%	32,6%	6,708	0,123	10,9%	44,6%
	Pupil, student, further training, unpaid work experience	7,1%	6,6%	0,93	0,84	22,4%	29,6%	8,1%	9,2%	4,109	6,168	10,1%	9,5%
	In retirement or in early retirement or has given up business	21,6%	26,5%	0,94	1,08	19,8%	12,5%	21,7%	15,4%	1,758	0,854	13,1%	5,2%
	Permanently disabled or/and unfit to work	1,5%	1,2%	0,67	0,81	40,0%	28,2%	3,0%	1,5%	5,148	3,217	2,6%	0,9%
	In compulsory military community or service	0,4%	0,2%	1,02	1,00	23,2%	30,2%	0,5%	0,3%	3,901	7,692	0,6%	0,4%
	Fulfilling domestic tasks and care responsibilities	14,2%	11,9%	0,84	0,82	26,2%	28,5%	18,9%	15,7%	3,833	6,310	18,7%	17,3%
	Other inactive person	1,0%	0,9%	0,86	0,76	31,2%	37,2%	1,6%	1,6%	7,278	4,746	2,5%	1,0%
	GREECE	100,0%	100,0%	1,00	1,00	19,7%	21,5%	100,0%	100,0%	2,912	1,511	100,0%	100,0%

Education level	*Primary education not completed*	6,0%	4,3%	0,71	0,80	29,2%	22,8%	9,2%	4,6%	2,847	2,514	6,0%	2,5%
	Primary education	26,2%	22,2%	0,79	0,82	26,6%	25,1%	36,4%	26,0%	3,477	4,546	32,0%	23,1%
	Lower secondary education	12,3%	11,8%	0,83	0,80	27,3%	33,1%	17,5%	18,2%	4,560	7,114	19,7%	19,2%
	(Upper) Secondary education	32,0%	32,9%	1,01	0,93	16,2%	24,0%	27,1%	36,8%	2,807	5,342	31,6%	40,2%
	Post-secondary non tertiary education	4,4%	6,3%	1,10	1,09	11,9%	18,0%	2,7%	5,3%	1,631	3,420	2,5%	4,9%
	First stage of tertiary education	18,7%	22,0%	1,51	1,49	7,2%	9,0%	7,1%	9,2%	1,248	1,991	8,2%	10,0%
	Second stage of tertiary education	0,5%	0,5%	1,89	1,88	0,0%	0,0%	0,0%	0,0%	0,000	0,000	0,0%	0,0%
	GREECE	100,0%	100,0%	1,00	1,00	19,1%	21,5%	100,0%	100,0%	2,842	4,369	100,0%	100,0%

Table 3-Poverty, 2008 - 2013

4.2. Estimating the Distributional Impact of the Greek crisis - Inequality

Economic inequality was traditionally a matter in Greece, despite the favourable economic conditions (Katsikas, Karakitsios and Filinis). During the crisis the situation deteriorated, which was expected. More specifically, during the first years of the crisis inequality rates barely changed, however they increased significantly in 2012 and afterwards (Matsaganis and Leventi, The Distributional Impact of the Greece Crisis in 2010) (Matsaganis, The Greek Crisis: Social Impact and Policy Responces). This happened as austerity policies in 2010-2011 had an equalizing effect, which was stronger than any inequality-increasing effects of various changes in the economy (e.g. job losses) (Matsaganis, The Greek Crisis: Social Impact and Policy Responces). Nevertheless, the income distribution was compressed downwards and, as observed in Section 4.1, large proportion of population fell below the poverty threshold.

Aggregate Inequality	2008	2013	% of change (2008-2013)
Relative mean deviation	0,234	0,232	-0,9%
Coefficient of variation	0,769	0,776	0,9%
Standard deviation of logs	1,001	1,014	1,2%
Gini coefficient	0,334	0,335	0,3%
Mehran measure	0,452	0,461	2,0%
Piesch measure	0,275	0,272	-1,1%
Kakwani measure	0,101	0,103	1,7%
Theil entropy measure	0,206	0,207	0,6%
Theil mean log deviation measure	0,251	0,265	5,8%
Atkinson(1)	0,222	0,233	5,1%
Atkinson(0.5)	0,098	0,101	3,5%

Table 4 - Aggregate inequality

As shown in Table 4, most inequality measures show an increase in inequality in Greece for the years 2008-2013. There are two measures indicating lower poverty, however, Relative Mean Deviation for example does not take into account transfers on the same side of the mean. One can observe that indices with a greater sensitivity to the lower tail of the distribution - as are Theil Mean Log Deviation (MLD) or the Atkinson Index. In this study, as mentioned earlier in Section 4, three measures are used to examine inequality. These are Gini Coefficient, which is more sensitive to changes around the median of the distribution, Atkinson for epsilon equals 1 and 0.5 (the higher the value of epsilon used, the more sensitive is the index to changes in distribution at the bottom end of the

distribution) and Theil MLD - again, more sensitive to the bottom of the distribution. Only Atkinson and Theil MLD allow the quantification of the contributions of disparities "within" and "between" population groups to aggregate inequality.

The population was divided in the same seven population groups as in poverty decomposition analysis (gender, sex of the HH head, age, HH size, labour market status, educational level and geographical location). Inequality seems to have increased during these 5 years to 0.265 in 2013 from 0.251 in 2008 (Theil MLD measure). If one observes the results of this dataset, he/she can observe that when the population is broken down into 7 education-level groups, approximately 11 percent of the aggregate inequality is due to disparities between these educational groups. This suggests that education remains over time the major factor affecting inequality and poverty. Other studies, e.g. Mitrakos in "Inequality, poverty and social welfare in Greece" indicate similar results. "Educational inequalities seem to be much more closely linked to economic inequalities than other demographic and socioeconomic factors" (Mitrakos).

Furthermore, disparities in HH size account for 5.1 percent of the aggregate inequality. In the results of this study, one can observe a reverse U shape describing inequality in 2013 for the Theil MLD measure. The four-member HH group seem to suffer the highest inequality (0.318 for Theil MLD, also confirmed by the Gini Coefficient, increased by almost 12 percent). However, there is no strong relation between the size of the HH and inequality in 2008. One can also observe that the crisis increased not only the inequality within groups but the inequality between groups as well, that is for 2008 the contribution of educational disparities to the aggregate inequality was only 0.2 percent.

The last factor with a seemingly large contribution to aggregate inequality is labour market status. Specifically, disparities in the work type attribute to 8.8 percent of the aggregate inequality, a rate increased by 1.2 percent from the 2008 levels. The most negatively affected by the crisis groups, were the employees working part-time, individuals in compulsory military community or service and - as expected - the unemployed. For the employees working full- time and other groups, such as the individuals with disabilities that are unfit to work and those fulfilling domestic tasks, the image is unclear, as the measures indicate different results.

With respect to gender, it seems to be quite insignificant as a contribution to the aggregate inequality. Inequality seems to have

increased for men - however, for women the image is not clear - as the Gini Coefficient shows a decrease for females, with all the other indices suggesting the opposite. Nevertheless, when examining inequality within the gender of the HH head, one can observe that inequality for HHs headed by females has risen significantly, while this is not the case for HHs headed by males. The contribution of inequality between the two groups is rather small, of 0.5 percent.

Regarding disparities between age groups, the contribution to aggregate inequality seems to have decreased. Typically, there is a strong positive relation between age and inequality (Tsakloglou, Aspects of inequality in Greece), however, this is not shown in this study. As already mentioned in the Section 4.1, the crisis affected very negatively individuals of the first two age groups, while the most favoured age group seemed to be the last one, the elderlies. Therefore, high and rising inequality was indeed expected for people younger than 30, in addition to low inequality rates for the elder individuals.

Finally, disparities between geographical areas attribute to 1.6 percent of the aggregate inequality, a decreased contribution regarding the 2008 levels, when it was equal to 2.4 percent. Inequality seems to have increased for Attiki and Crete, while it has been decreased for Northern and Central Greece.

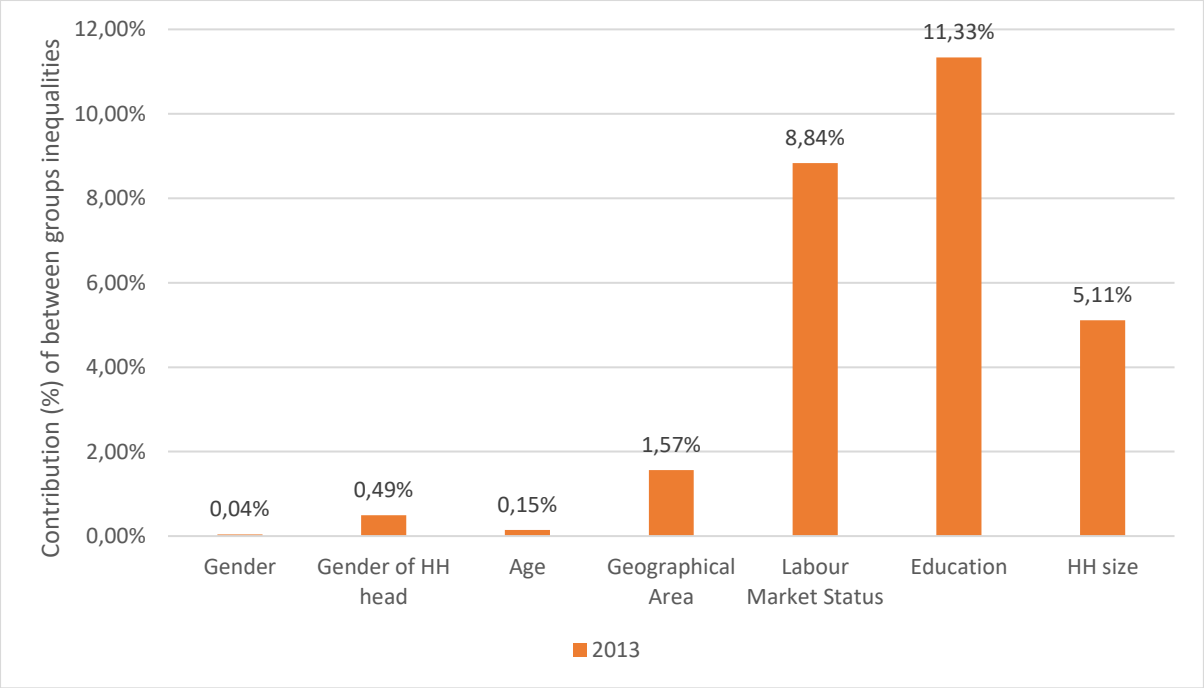

Figure 2 - Inequality decomposition by population group: Contribution (%) of "between groups" inequalities

Population Group		Population Share		Mean Equivalised Disposable Income		Gini		Atkinson 0.5		Atkinson 1		Theil mean log deviation	
		2008	2013	2008	2013	2008	2013	2008	2013	2008	2013	2008	2013
Gender	Males	49,2%	49,2%	1,01	1,02	0,334	0,338	0,099	0,104	0,228	0,238	0,259	0,272
	Females	50,8%	50,8%	0,99	0,98	0,333	0,332	0,097	0,099	0,216	0,228	0,243	0,259
	Within groups											0,251	0,265
	Between groups											0,000	0,000
	Within groups (contribution)											1,000	1,000
	Between groups (contribution)											0,000	0,000
	GREECE	100,0%	100,0%	1,00	1,00							0,251	0,265
Gender of Head	Male Headed HH	85,5%	82,2%	1,01	1,02	0,335	0,337	0,099	0,102	0,224	0,224	0,253	0,254
	Female Headed HH	14,5%	17,8%	0,92	0,90	0,320	0,320	0,088	0,098	0,206	0,268	0,231	0,312
	Within groups											0,250	0,264
	Between groups											0,001	0,001
	Within groups (contribution)											0,996	0,995
	Between groups (contribution)											0,004	0,005
	GREECE	100,0%	100,0%	1,00	1,00							0,251	0,265
Age	Children (age ≤15)	15,4%	16,5%	0,99	0,93	0,352	0,369	0,111	0,120	0,243	0,265	0,279	0,300
	15-29	17,5%	15,6%	0,98	0,88	0,331	0,344	0,097	0,106	0,223	0,267	0,252	0,301
	29-44	23,3%	22,7%	1,04	1,07	0,323	0,357	0,094	0,115	0,226	0,252	0,256	0,285
	44-64	25,5%	26,6%	1,07	1,05	0,348	0,353	0,107	0,114	0,243	0,276	0,278	0,311
	Age≥65	18,3%	18,6%	0,88	1,00	0,291	0,253	0,072	0,055	0,159	0,107	0,173	0,113
	Within groups											0,249	0,265
	Between groups											0,001	0,000
	Within groups (contribution)											0,994	0,999
	Between groups (contribution)											0,006	0,001
	GREECE	100,0%	100,0%	1,00	1,00							0,251	0,265

Area	Northern Greece	32,0%	31,1%	0,87	0,87	0,321	0,305	0,090	0,085	0,215	0,205	0,242	0,229
	Central Greece	20,1%	21,3%	0,92	0,91	0,348	0,321	0,107	0,091	0,221	0,219	0,250	0,247
	Attiki	37,9%	37,4%	1,16	1,18	0,328	0,360	0,097	0,117	0,227	0,265	0,258	0,308
	Southern Aegean & Crete	10,0%	10,2%	0,98	0,93	0,299	0,305	0,076	0,084	0,175	0,196	0,192	0,218
	Within groups											0,245	0,261
	Between groups											0,006	0,004
	Within groups (contribution)											0,976	0,984
	Between groups (contribution)											0,024	0,016
	GREECE	100,0%	100,0%	1,00	1,00							0,251	0,265

Labour Market Status	Sum Employee working full-time	45,1%	32,7%	1,15	1,29	0,325	0,326	0,094	0,096	0,208	0,195	0,233	0,216
	Sum Employee working part-time	4,3%	4,4%	0,83	0,82	0,309	0,324	0,081	0,093	0,170	0,232	0,186	0,264
	Unemployed	4,7%	15,7%	0,76	0,67	0,337	0,372	0,103	0,132	0,275	0,368	0,322	0,459
	Pupil, student, further training, unpaid work experience	7,1%	6,6%	0,93	0,84	0,342	0,343	0,105	0,105	0,246	0,263	0,282	0,305
	In retirement or in early retirement or has given up business	21,6%	26,5%	0,94	1,08	0,301	0,263	0,075	0,057	0,159	0,111	0,173	0,117
	Permanently disabled or/and unfit to work	1,5%	1,2%	0,67	0,81	0,281	0,281	0,082	0,069	0,275	0,161	0,321	0,175
	In compulsory military community or service	0,4%	0,2%	1,02	1,00	0,324	0,397	0,097	0,144	0,281	0,396	0,329	0,504
	Fulfilling domestic tasks and care responsibilities	14,2%	11,9%	0,84	0,82	0,314	0,310	0,090	0,093	0,220	0,230	0,249	0,261
	Other inactive person	1,0%	0,9%	0,86	0,76	0,360	0,338	0,119	0,107	0,333	0,222	0,406	0,251
	Within groups											0,232	0,242
	Between groups											0,019	0,023
	Within groups (contribution)											0,924	0,912
	Between groups (contribution)											0,076	0,088
	GREECE	100,0%	100,0%	1,00	1,00							0,251	0,265

Education level	Primary education not completed	6,0%	4,3%	0,71	0,80	0,239	0,218	0,049	0,041	0,119	0,084	0,126	0,088
	Primary education	26,2%	22,2%	0,79	0,82	0,279	0,263	0,070	0,065	0,179	0,172	0,197	0,189
	Lower secondary education	12,3%	11,8%	0,83	0,80	0,302	0,328	0,081	0,097	0,208	0,231	0,233	0,263
	(Upper) Secondary education	32,0%	32,9%	1,01	0,93	0,308	0,320	0,085	0,094	0,203	0,241	0,227	0,275
	Post-secondary non tertiary education	4,4%	6,3%	1,10	1,09	0,293	0,325	0,077	0,099	0,166	0,230	0,181	0,262
	First stage of tertiary education	18,7%	22,0%	1,51	1,49	0,309	0,324	0,086	0,096	0,186	0,206	0,206	0,230
	Second stage of tertiary education	0,5%	0,5%	1,89	1,88	0,228	0,325	0,045	0,088	0,089	0,158	0,093	0,172
	Within groups											0,207	0,235
	Between groups											0,043	0,030
	Within groups (contribution)											0,827	0,887
	Between groups (contribution)											0,173	0,113
	GREECE	100,0%	100,0%	1,00	1,00							0,251	0,265

HH size	Member:1	20,1%	25,7%	0,92	1,00	0,350	0,310	0,110	0,090	0,248	0,220	0,284	0,248
	Members:2	28,2%	29,5%	1,03	1,12	0,326	0,308	0,089	0,090	0,195	0,205	0,213	0,230
	Members:3	21,1%	19,8%	1,05	1,11	0,332	0,331	0,100	0,098	0,245	0,220	0,280	0,249
	Members:4	27,3%	15,5%	1,00	0,98	0,325	0,364	0,096	0,117	0,216	0,273	0,243	0,318
	Members:5	2,4%	6,9%	0,93	0,76	0,339	0,310	0,098	0,086	0,198	0,204	0,220	0,228
	Members:6 or more	0,9%	2,7%	0,74	0,72	0,314	0,331	0,086	0,096	0,201	0,206	0,224	0,231
	Within groups											0,250	0,252
	Between groups											0,001	0,014
	Within groups (contribution)											0,998	0,949
	Between groups (contribution)											0,002	0,051
	GREECE	100,0%	100,0%	1,00	1,00							0,251	0,265

Table 5 - Inequality, 2008-2013

It is now the time to answer an intriguing question; have the rich become richer and the poor poorer? It is not surprising that such an interesting question does not have a straightforward answer; it depends on how the income distribution is analysed. Naturally, different social categories and income groups are affected in a different way. Individuals in poverty pre-crisis, were not fully protected, but faced lower losses than the average individual in Greece (at least in monetary terms). In contrast, those first entering poverty during the crisis did so because they lost a significantly large proportion of their income (Matsaganis, The Greek Crisis: Social Impact and Policy Responces).

The above results suggest that the crisis stroke particular population groups much more than others. For example, HHs headed by females were facing rather large poverty rates, in addition to significantly high inequality, in contrary to HHs headed by males. Nevertheless, with respect to gender, the crisis seems to have smoothed the positive jaws in the income distribution between men and women. Regarding age groups, the traditional pattern of lower poverty rates among younger individuals and higher rates for the older ones seems to be reversed. Specifically, the elderly seem to have improved their relative position in terms of income, while the exact opposite happened for the youth.

Considering decomposition with respect to the main labour activity of a person, the two groups that suffered greater deterioration concerning poverty and inequality, i.e. unemployed and individuals occupied at part-time jobs, were already facing poverty and inequality ratios of a very high level even before the crisis. Adding to the deterioration of the situation, the population shares of these groups grew, consisting a larger proportion of the 2013 population.

5. Conclusions

Overall, austerity policies and wider recession seem to be closely connected. On the one hand, austerity policies caused aggregate demand to fall as most undertaken measures had small redistributive effect and were applied in a period of an already deep recession. On the other hand, the recession weakened the deficit-reducing potential of austerity policies, creating the need for adoption of even harsher measures.

Fiscal consolidation packages have not uniformly affected the whole population. There were multiple negative developments, along with the ongoing crisis. The median income has significantly decreased from €10,760

in 2008 to €8,380 in 2013, indicating a further decrease in the poverty line and that a large proportion of the Greek population fell under the poverty threshold. Specifically, the poverty rate in 2013 was 22.9 percent from 20.3 percent in 2008. The gap in living standards was furtherly deteriorated. Measures significantly affected sensitive population groups such as the unemployed, people working part time jobs, children or females being heads in households even though the gap between the two genders has generally decreased) etc.

The level of inequality and poverty in Greece remained substantially higher than in most developed countries (OECD). Regarding the structure of inequality, results from decomposition analysis suggested that, inequality stemmed primarily from differences "within" rather than "between" socioeconomic groups. Therefore, policies aiming at alleviating inequality should be "general", i.e. tax policies, general welfare policies, etc., rather than "specific", taking particular group characteristics into account (Mitrakos). Although specific policies may be proposed for other reasons, this suggestion shows that they may not be very effective at reducing economic inequality. Nevertheless, education seems to remain the most important factor for reducing inequality and poverty, due to the fact that educational inequalities seem to be much more closely linked to economic inequalities than other demographic and socioeconomic factors.

Despite the positive developments in 2014 where the situation in Greece seemed to improve, in 2016 the reasons that caused this crisis remain unchanged. Even though significant efforts have been made in the last years to decrease inequalities and imbalances not only for the case of Greece but across European Union, problems as unemployment and poverty in general and even more in younger ages remain unsolved. As this challenges EU's policies as a whole and may be raising concerns regarding its sustainability due to existing divergences, it should be considered as one of the most urgent issues for EU policies to address in the future.

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