The impact of the economic crisis on poverty and welfare in Athens

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Abstract - This paper sets out to estimate the impact of the recent economic crisis and austerity measures on income and welfare conditions across municipalities in the Athens metropolitan area. Using data from a unique dataset, which incorporates economic, social and demographic variables for the Athenian municipalities, we illustrate the evolution of three main socio-economic indicators within Athens: mean equivalised income; at-risk-of-poverty rates; and material deprivation. The dataset covers a 12-year period, starting from 2004 and moving on to 2015, including the transition of a prospering economy to a vicious cycle of economic recession. Analysis of the results indicates that the economic crisis has had a tremendous impact on welfare conditions across the metropolitan area of Athens. At-risk-of-poverty rates have increased, and welfare conditions have deteriorated substantially. Moreover, the least well-off areas have shown an increased vulnerability to crisis, thus leading to enlarged income and welfare inequality, as well as social polarization across space. However, the ranking of municipalities throughout this whole study-period remains relatively stable, strengthening the hypothesis that social phenomena show high persistence over time.

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INTRODUCTION

There is no clear evidence supporting the fact that during recession periods inequality and welfare conditions worsen (Atkinson and Morelli, 2011). When looking at the drivers of inequality, aspects of supply, trade and technology play an important role in its formation, specifically at lower levels of income distribution (Atkinson et al., 2009; Acemoglu, 2011). The ways in which governments encounter inequality throughout periods of economic crises affect its redistribution effects, as well as its depth of penetration into society. In many cases, initial policy responses to a financial crisis include the adoption of austerity measures intended to reform the financial sector. As a result, the resurgence and maintenance of austerity policies adopted by governments have reinforced income inequalities, making the recovery process more uncertain and fragile (UN, 2014).

In some countries, tax benefit systems have shifted income inequality to higher parts of the distribution, reinforcing inequality trends and leading to a vicious cycle of slow growth and poor social progress (OECD, 2011). Choosing well-specified income-support policies, not only during periods of economic recession, but also throughout the overall recovery process, without disconnecting economic policies from their social consequences, is essential. The investigation of the distributional effects of fiscal austerity has revealed a variation between countries, regarding their responses to austerity policies (Ball et al., 2013; Larrimore et al., 2013; Jenkins et al., 2013; Callan et al., 2014; Schneider et al., 2016). Although in some cases fiscal consolidation episodes have prompted significant and long-lasting increases in income inequality, there is still no clear evidence of their impacts. The differences between case studies may result from different initial conditions (Jenkins et al., 2013; Schneider et al., 2016).

According to Donald et al. (2014) there is an urgent need for further investigation of the impacts of austerity over a wide range of spatial levels, focusing primarily on sub-national and urban scales. This is due to the disproportional effect that austerity policies seem to have on specific social groups, defined not only by demographic characteristics, but also by spatial reference units. Meegan et al. (2014) also argue that austerity seems to be especially urbanized, since cities rely, to a large extent, on public services and public employment, which are often an important part of the reform process. In addition to this, diversification of urban institutional, sectoral and social characteristics widely influences the transmission channels through which austerity policies affect each city separately.

The 2008 financial crisis had several impacts on a sub national and city-region scale, which in many cases have resulted in an intensified socio-spatial segregation at neighborhood, intra- or inter-city level (Donald et al., 2014). The disconcerting fact is that absolute levels of inequality rose during this recession period, whilst at the same time, the population living under conditions of extreme poverty in specific neighborhoods also increased, in absolute as well as in relative numbers (Kneebone et al., 2011). Poverty is becoming even more concentrated areas of large urban agglomerations, fueling intra-urban inequality. Of course, this post-crisis intra-urban inequality has emerged as an additional force in the already existing phenomenon of social polarization within cities (Crankshaw, 2017; Boterman et al., 2018). The roots of this pre-crisis urban social divide can be found in the gradual transformation of occupational structure in city-areas (Sassen, 2001; Hamnett, 1994, 1996, 2002; Panori et al., 2018), as well as in additional forms of inequalities, such as educational inequality (Berry & Glaeser, 2005; Glaeser et al., 2009; Florida & Mellander, 2016). In this context, encompassing the spatial dimension is a key enabling factor to explaining intra-urban inequality (Maloutas, 2007; Hulchanski, 2010; Zwiers et al., 2015; Panori and Psycharis, 2017).

The originality of this paper lies in the fact that it aims to illustrate the evolution of selected inequality and poverty measures at a sub-regional level. It uses data for the case of the metropolitan area of Athens, during a 12-year period including a pre- and post-crisis span (2004-2015). Given the fact that Athens is characterized by a fully urban structure, this study offers an essential opportunity to explore possible links that might arise between the economic crisis, income inequality and poverty within a large urban agglomeration during a recession period. Are there any shifts in the existing social segregation patterns in the post-crisis period? Do inequality and poverty, absolute or relative, illustrate similar behavioral characteristics throughout the entire crisis period?

This paper is structured as follows: Section 1 presents an overview of the case of Greece and more specifically Athens, presenting some evidence from the literature related to the 2008 financial crisis. Section 2 introduces the main data and methodological frameworks that were used in the analysis, whilst in Section 3 the key findings of the study are presented. The main conclusions and some discussion for further investigation are given in Section 4.

1. THE GREEK CASE

During the last decade, Greece has undoubtedly experienced the financial crisis in a more severe way than any other European country. In terms of social conditions, there has been a sharp increase in the number of people living in poverty or experiencing social exclusion, especially since 2010. The severity of the economic crisis is even more clear when comparing the Greek case with the overall EU-27 mean. As shown in Fig.1, at-risk-of-poverty rates[3] have sharply increased in Greece between 2004 and 2015, whilst EU-27 values indicate a much smaller rise during the period under investigation. Even more diversity can be seen in the case of material deprivation[4], as the trends between the two curves move in an opposite direction.

By taking a closer look at Fig.1, it becomes evident that, especially after 2010, there has been a significant deterioration in absolute social conditions in Greece, despite the small initial improvement in poverty and social exclusion rates at the beginning of the economic crisis period, in 2008 and 2009. More specifically, the at-risk-of-poverty rates have increased substantially, reaching their peak values in 2012 and 2013 (23.1% in both cases), starting from an initial value of 19.9% in 2004, while material deprivation rates have climbed up to 40% in 2015, starting from 25% back in 2004. At the same time, when looking into additional aspects of social exclusion, significant negative effects have also been reported in the literature in terms of housing and health conditions (Ifanti et al., 2013).

The previous findings refer to absolute changes in living conditions. However, when exploring relative changes in income inequality and poverty, interesting facts come to light, without strongly supporting the hypothesis that inequality has risen dramatically during the recession period (Matsaganis & Leventi, 2011, 2013; Mitrakos, 2014; Katsimi et al. 2015; Andriopoulou et al., 2017). On the contrary, there

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[3] According to Eurostat, the at-risk-of-poverty rate is the share of people with an equivalised disposable income (after social transfer) below the at-risk-of-poverty threshold, which is set at 60% of the national median equivalised disposable income after social transfers. See:
https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:At-risk-of-poverty_rate
[4] According to Eurostat, material deprivation refers to a state of economic pressure, where there is difficulty to pay unexpected expenses, afford a one-week annual holiday away from home, a meal involving meat, chicken or fish every second day, the adequate heating of a dwelling, durable goods like a washing machine, colour television, telephone or car, being confronted with payment arrears (mortgage or rent, utility bills, hire purchase instalments or other loan payments). See:
https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Material_deprivation

is evidence that austerity led to an initial reduction of income inequality in Greece during the first years of recession, due to a significant shrinkage in wages (Fusco et al., 2010; Matsaganis, 2013; Matsaganis & Leventi, 2014). Leventi and Matsaganis (2016) try to thoroughly investigate the distributional impact of different consolidation policies on the evolution of the Gini index for the case of Greece during the period 2009-2014. Their findings indicate that there is a positive effect on overall income inequality in cases where the policies implemented mostly affect households at the top levels of income distribution (cuts in public sector salaries and pensioners' solidarity contributions). On the contrary, measures related to poorer social groups (such as cuts in unemployment benefits) trigger negative inequality effects. Moreover, additional evidence indicates that persistent high unemployment rates and austerity seem to have caused consumption inequality to rise, increasing the risk long-lasting consequences for poverty and inequality outcomes (Kaplanoglou and Rapanos, 2018).

Figure 1: Evolution of at-risk-of-poverty and material deprivation rates (%) in Greece 2004-2015
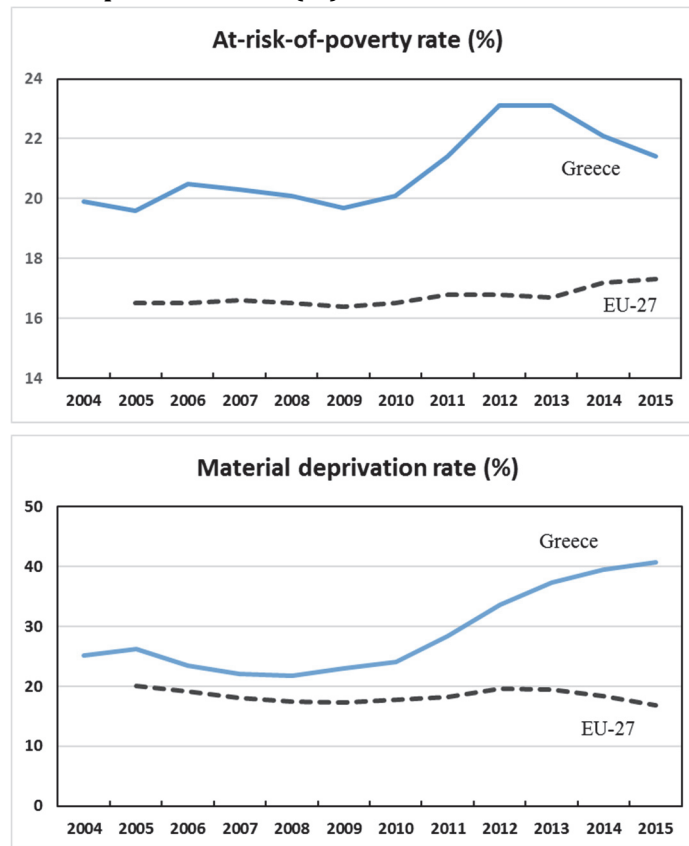

Source: Eurostat [ilc_peps11, ilc_mdsd08].

When looking at policy implications regarding inequality and poverty crucial questions arise, specifically when trying to explore evidence referring to the existence of socio-spatial justice (Hadjimichalis 2011). Monastiriotis (2011) points out that horizontal austerity measures may lead to a widening of the existing unequal

spatial distribution of economic outcomes in Greece, broadening regional dispari-
ties. To this end, The role of the spatial dimension is highlighted and in fact lies at
the center of this investigation. However, little attention has been given by the liter-
ature when trying to move from a regional perspective to an urban level of analysis.
Psycharis et al. (2014), in an exploration of the regional impact of the economic cri-
sis, states that that metropolitan areas were more vulnerable during this period,
whereas islands have shown a higher level of resilience. More specifically, they indi-
cate that although highly urbanized areas are positively related to higher levels of
development during periods of economic prosperity, they also seem to be affected
the most in periods of economic recession. In terms of social inclusion, Leventi and
Matsaganis (2016) come to a similar conclusion, pointing out that Athens has been
severely affected by the rise in poverty during the economic crisis period. Nonethe-
less, additional findings show that income distribution at a NUTS3 level did not ex-
perience significant changes during the post-crisis period, with the Attica region still
indicating higher values compared to the overall national income distribution (Psy-
charis and Pantazis, 2016).

**Figure 2: Evolution of at-risk-of-poverty and material
deprivation rates (%) in Attica 2004-2015**
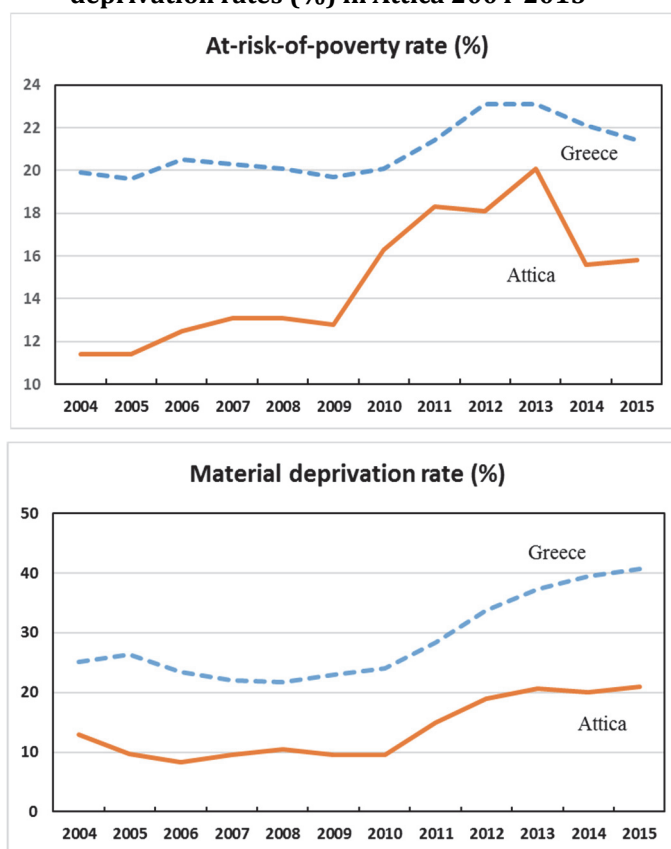
Source: Eurostat.

Fig.2 presents the evolution of at-risk-of-poverty rates and material deprivation
in the greater Attica region, compared to the total shares for Greece. As can be seen,

although Attica demonstrates much lower shares of at-risk-of-poverty, the increase between 2009-2013 is particularly sharp. It must be pointed out that poverty in this case does not refer to anchored poverty rates, but rather is based on time-varying poverty lines. The picture would be different and closer to the material deprivation trend, if we used anchored poverty estimates, as both these measures express absolute exclusion measures. In the case of material deprivation, there seems to be a continuously rising pattern, which becomes sharper after 2010. In this case there is a similar behavioral pattern between Attica and Greece as a whole.

All previous discussion indicates two main arguments that strongly support the choice of Athens as an essential case study, when trying to investigate the social consequences of the 2008 financial crisis. First, Greece by itself constitutes a special case, as it is still experiencing severe economic changes. This long-lasting situation has created an environment of an extended austerity policy, whose social implications have undergone multiple transformations, each time affecting people's standard of living in a different way. Within this framework, the urban area of Athens constitutes a region of an increased interest, as its population has been vastly affected, not only by the policies implemented, but also by the overall economic transformations. The next section provides details regarding the data sets used in this study to explore the evolution of socio-economic patterns within the metropolitan area of Athens, during the period 2004-2015.

2. DATA AND METHODOLOGY

Measuring income and its inequality components at low spatial levels is not a simple process. It is essential to stress that given the lack of data at an urban level of analysis, the need for adopting new innovative computational techniques to enrich the available data at low spatial levels for investigating complex socio-economic phenomena becomes evident. To this end, all the essential input for exploring these variables comes from the SimAthens database, which is based on simulated results of a static spatial microsimulation model (Panori et al., 2017). Even though the analysis is based on simulated data, indicating weaknesses in some cases, this database is the only available data source for low spatial level of analysis, referring to income and social inclusion indicators. Variables used in this paper to approximate socio-economic conditions for each one of the 59 municipalities within the metropolitan area of Athens include mean equivalised income per capita, at-risk-of-poverty rates and material deprivation.

According to the OECD (2013), mean equivalised income per capita refers to the standardized economic resources available to each individual in a household, where standardization reflects the economies of scale relevant to the household. At the same time, at-risk-of-poverty rate is calculated as the share of people living in households under the poverty threshold, which is defined as 60% of the national median equivalised disposable income after social transfers. The poverty threshold changes every year, as it is redefined, based on the yearly national median equivalised disposable income after social transfers.

Furthermore, the work of Guio et al. (2009) has been used as the baseline for calculating material deprivation shares. This indicator focuses on some key aspects of material living conditions and is defined as the proportion of people living in households lacking at least three of a list of nine basic items (Fusco et al. 2010; Guio et al., 2009). More specifically, the list refers to the ability of the household to afford at least three of the following items: to pay their rent, mortgage or utility bills; to keep their home adequately warm; to face unexpected expenses; to eat meat or proteins regularly; to go on holiday; a television set; a washing machine; a car; and a telephone. Material deprivation is anchored through time, as the list of the nine basic

items does not change. For each individual *i=1,..,n*, we consider x_{ij} to be the (non-negative) level of deprivation, for which a weighted sum on items *j=1,..,m* is calculated, according to the following:

$$u_i = \sum_{j=1}^{m} w_j x_{ij}$$

where, x_{ij}=1 refers to an enforced lack of item j and x_{ij}=0 otherwise. At the same time, the weights w_j are equal for all items.

In order to more thoroughly investigate the impact of the economic crisis on the socio-economic conditions within Athens, we choose to use not only the 59 municipalities located within the metropolitan area of Athens, but also three discrete income groups of municipalities (high, middle and low), derived through a clustering method, based on mean equivalised income (Panori, 2017). Ward's hierarchical grouping technique was followed and the objective function that was chosen to be optimized was based on the minimum variance criterion (Ward, 1963). According to this criterion the objective function value that needs to be minimized is the sum of the squared deviations from the group mean (ESS) and it is given by equation (1):

$$ESS = \sum_{i=1}^{n} x_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} x_i\right)^2 \qquad (1)$$

where x_i is the score of i-th individual. In our case, this variable takes the values of mean equivalised income for each municipality in 2004.

As a next step to investigate of the impact of economic crisis on poverty and welfare conditions in Athens, a panel-based analysis for convergence between Athenian municipalities has also been performed. This second empirical part aims to reveal the existence of any possible convergence trends between the Athenian municipalities, in terms of income and material deprivation rates. The results of this analysis are important, as they try to reveal insights regarding the development process of income inequality and social conditions in Athens, during a long-lasting period of economic crisis.

We choose to follow the stochastic definition of convergence, stated by Bernard & Durlauf (1995), in order to investigate the existence of convergence patterns. According to this definition, the log GDP per capita of country i, $y_{i,t}$, and the log GDP per capita of country j, $y_{j,t}$, converge, if and only if, their difference $y_{i,t} – y_{j,t}$ is stationary with zero mean. Evans (1998) expands this definition by formulating a method that uses panel data to assess existing growth theories. Instead of examining whether the previous condition holds for each possible pair of countries separately, he points out that all members of the group converge pair-wise, if $y_{i,t} – y_{j,t}$ is stationary for each member i=1,2,...., N of the panel. In other words, Evans argues that the null of non-convergence can be interpreted as the unit root null in the panel unit root test (Pedroni & Yao, 2005).

In this paper we choose to follow the panel unit-root testing framework, instead of performing separate unit-root tests on individual time series. Within this framework, the model of Evans and Karras (1996) is illustrated by the following functional form (equation (2)):

$$\Delta\left(y_{i,t} - \bar{y}_t\right) = \mu_i + \beta_i\left(y_{i,t-1} - \bar{y}_{t-1}\right) + \sum_{k=1}^{K_i} \varphi_{i,k}\Delta\left(y_{i,t-k} - \bar{y}_{t-k}\right) + \varepsilon_{i,t} \quad (2)$$

for i= 1,2,....,N; t= 1,2,....,T.

When looking more carefully at the previous model, it becomes clear that it expresses an Augmented Dickey-Fuller (ADF) regression that is applied to the difference $y_{i,t} - \bar{y}_t$. In this case, coefficient βi is the most essential parameter that needs to be defined, in order to test for the presence or absence of convergence in the panel data. Rejection of the unit-root null hypothesis (H0: βi = 0 for all i) implies that there is at least a subset of panel members that converge with each other.

The panel unit-root test of Im, Pesaran and Shin (2003) (IPS) has been chosen for testing the previous hypothesis. The main advantage of this test, in contrast with earlier generation panel unit-root tests (Breitung & Meyer, 1994; Quah, 1994; Levin et al., 2002), is the fact that it allows the value for coefficient βi to vary across regions, indicating that convergence dynamics show diversified behavior in space. In the case of the IPS test, the main idea is to construct a t-bar statistic (based on averaging the individual augmented Dickey-Fuller unit root t-tests for each region: $\bar{t} = \frac{1}{N}\sum_{i=1}^{N} t_i$). It also requires using balanced panel datasets.

As this paper does not intend to explore any alternative methodological approach considering panel unit-root testing, we will not insist on an even more detailed presentation of the methodology. The empirical results, obtained through the implementation process, are detailed in the next section.

3. RESULTS

Some basic stylized facts regarding the overall metropolitan area of Athens, as well as the derived municipality clusters, are detailed in Table 1 below. We have chosen to present the results corresponding to the years 2004 and 2015, as these two years are indicative reference years, representing the pre- and post-crisis period respectively. As the table demonstrates, Group 1 refers to the most deprived areas of Athens, which are characterized by low-income levels. At the same time, Groups 2 and 3 consist of medium and high-income areas respectively. The last column of Table 1 presents the proportional differences in income between 2004 and 2015, indicating that during this period the high-income cluster was affected the most (-14.34%), followed by the low-income group of municipalities (-13.10%).

**Table 1: Main characteristics of the three sub-groups**

Group	No. of obs. (abs - %)	Pop. share		Mean income (€/capita)		Diff.
		2004	2015	2004	2015	
Athens	59 (100%)	100%	100%	12,422	10,824	-12.86%
1	13 (22.03%)	21.0%	21.2%	11,357	9,869	-13.10%
2	24 (40.68%)	57.0%	55.8%	12,306	10,800	-12.24%
3	22 (37.29%)	22.0%	23.0%	13,735	11,765	-14.34%

Source: Authors' calculations.

Figure 3 presents the corresponding box-plots for the total number of municipalities for each year, helping us to understand the evolution of income, at-risk-of-poverty and material deprivation variables throughout the overall period under investigation. By looking at this graph, it becomes clear that the impact of the economic crisis and the fiscal reforms, started to become evident after 2009, when a sharp decrease of mean income is recorded and, at the same time, there is a sudden rise in poverty and material deprivation shares. Moreover, 2012 constitutes a turning point after which there seems to be a slight rise in the mean income levels that continues up until 2015. Nonetheless, income levels continue to be lower than 2004, whereas at-risk-of-poverty rates have declined to very low levels, when compared to 2004. Material deprivation values are still very high and there is no evidence of any gradual decline.

**Figure 3: Box-plots for municipal mean equivalised income,
at-risk-of-poverty shares, and the evolutions of material
deprivation between 2004 and 2015**

Mean equivalised income

At-risk-of-poverty rates

Material deprivation rates
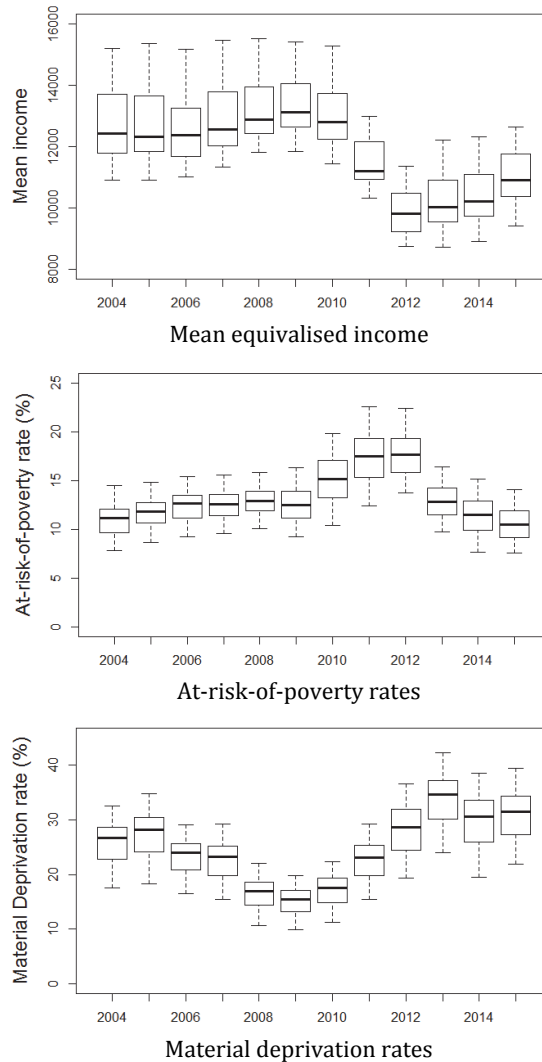
Source: Authors' calculations.

We chose to investigate whether there is any behavioral deviation between the derived clusters of municipalities, low, medium and high income, to further explore these findings. Starting from the spatial distribution of the clusters which is depicted in Figure 4 will help us to better understand whether they are spatially concentrated within the metropolitan area of Athens, or not. By looking at the map, it becomes clear that there is a discrete spatial zone at the north-west area of Athens incorporating low income areas (blue color). At the same time, high-income municipalities are located in the north and southeastern parts of Athens (red color), whilst areas corresponding to medium income municipalities are largely located in the urban

core of Athens (green color). Given these findings, it becomes evident that social segregation patterns existed within the metropolitan area of Athens before the 2008 economic crisis. These patterns illustrate interesting levels of spatial dependence, especially in the case of low-income areas.

Figure 4: Spatial distribution of the three main municipality clusters of the metropolitan area of Athens based on mean equivalised income values of 2011

Group 1   Low income areas
Group 2   Medium income areas
Group 3   High income areas
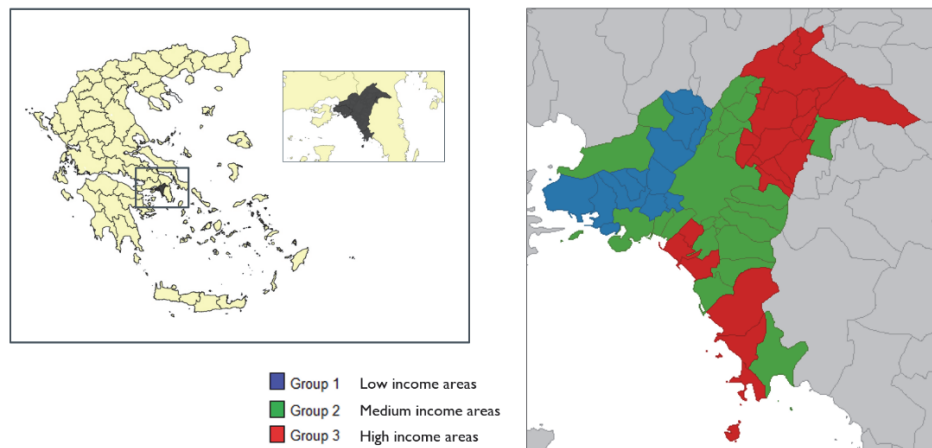
Source: Panori et al. (2017), Panori (2017) and authors' calculations.

Moving on, by looking at the Kernel diagrams for income distribution corresponding to each cluster (Fig.5), a first insight regarding the nature of income inequality within the three clusters can be gained. We choose to include the Kernel diagrams for the two extremes of income distribution: 2009 and 2012 to avoid the need for a large number of diagrams. The diagrams illustrate the distribution of income within the three groups of municipalities, just before and during the economic crisis period. In addition to the significant decrease in overall income levels, intriguing results arise regarding the patterns of income distributions. In the case of Group 2, the pattern of income distribution in 2012 remains similar to the 2009 pattern, illustrating a two-peak curve in both cases. This means that two groups of high-income areas exist: high and very high income. However, the same fact does not apply in the case of Group 2. Medium income areas seem to preserve their distribution pattern, which is very close to a normal distribution. Finally, an essential difference between 2009 and 2012 is observed for Group 1. The initial, very close to normal, distribution of income changes completely in 2012, when two distinct groups of low-income areas arise: low and very low-income municipalities.

These findings indicate that one crucial implication of the economic crisis period is the extended distortive effect on income distribution in the case of low-income areas. Instead of gradually moving from medium income areas to low and then very low-income municipalities, there seems to be a radical shift from low to very low incomes. However, the fact that the range of the distribution for Group 1 largely declines in 2012, shows that there has been a decrease in income inequality between disadvantaged areas. The same observation also applies in the case of high-income areas (Group 3).

Regarding the measurement of income inequality within the Athens metropolitan area, the Theil index of inequality is used, given its higher sensitivity to the upper

tail of the income distribution (Allison, 1978; Atkinson & Bourguignon, 2014), which experiences significant shifts during this period. Figure 6 represents the evolution of the Theil index: (a) calculated for the total number of municipalities within the metropolitan area of Athens, and (b) calculated for each cluster group separately. In the first case, the Theil index expresses the evolution of income inequality between Athenian municipalities, whereas in the latter one, the calculated values of the the Theil index illustrate the evolution of income inequality between municipalities belonging to each group separately.

Figure 5: Kernel diagrams of mean income distribution within the three municipal clusters for the years 2009 and 2012

2009

2012
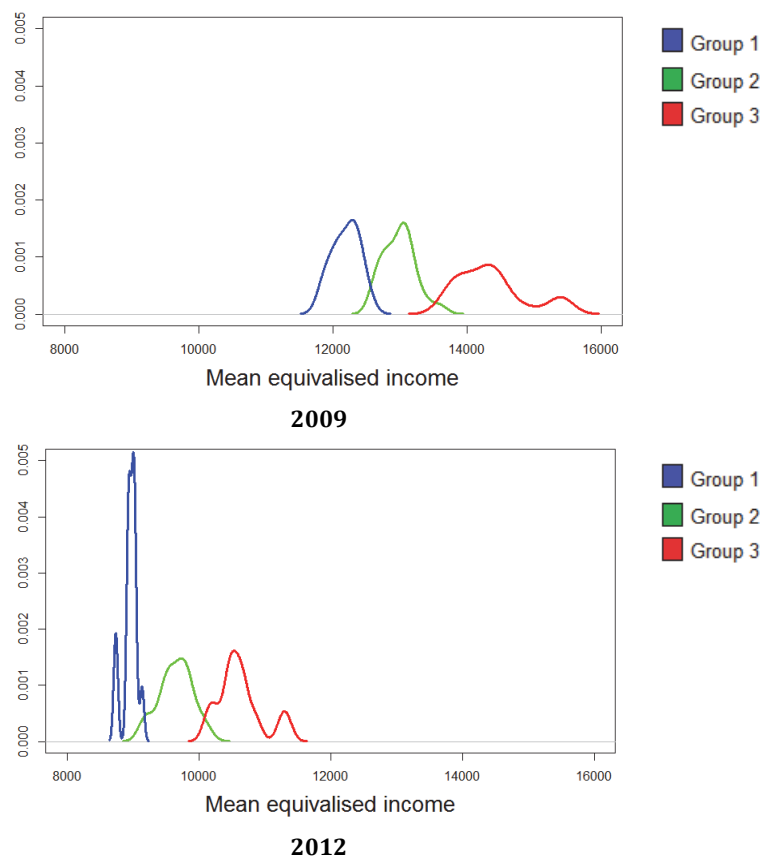
Source: Authors' calculations.

Figure 6 shows that during the period 2004-2011, a gradual decrease of income inequality was recorded, followed by a sharp increase in the period 2011-2013. When looking at the three different municipality clusters, Group 3 follows a similar pattern, whilst curves for Groups 1 and 2 vary. It is interesting to note that Group 3 is characterized by higher values of income inequality during the whole period under investigation, following the curve pattern of the overall metropolitan area of Athens. On the other hand, Groups 1 and 2 are characterized by much lower values of the Theil index, which do not change radically over time, but still demonstrate a slightly upward trend after 2009.

Figure 6: Evolution of the Theil index calculated for the total number of municipalities within the metropolitan area of Athens and for each cluster group separately
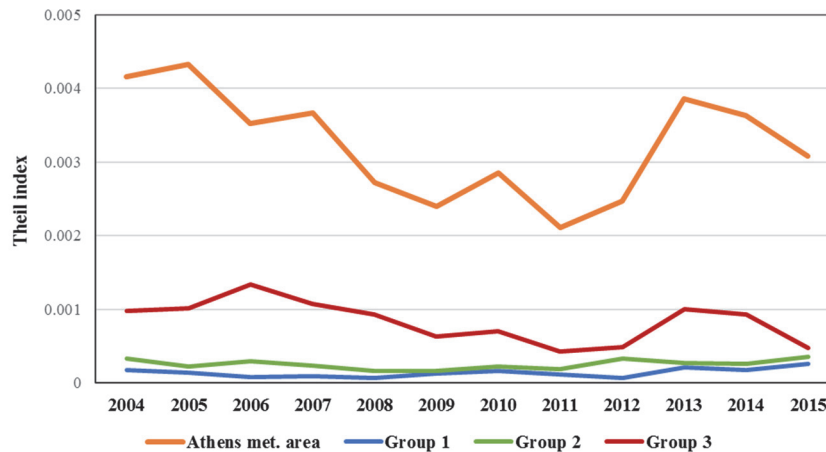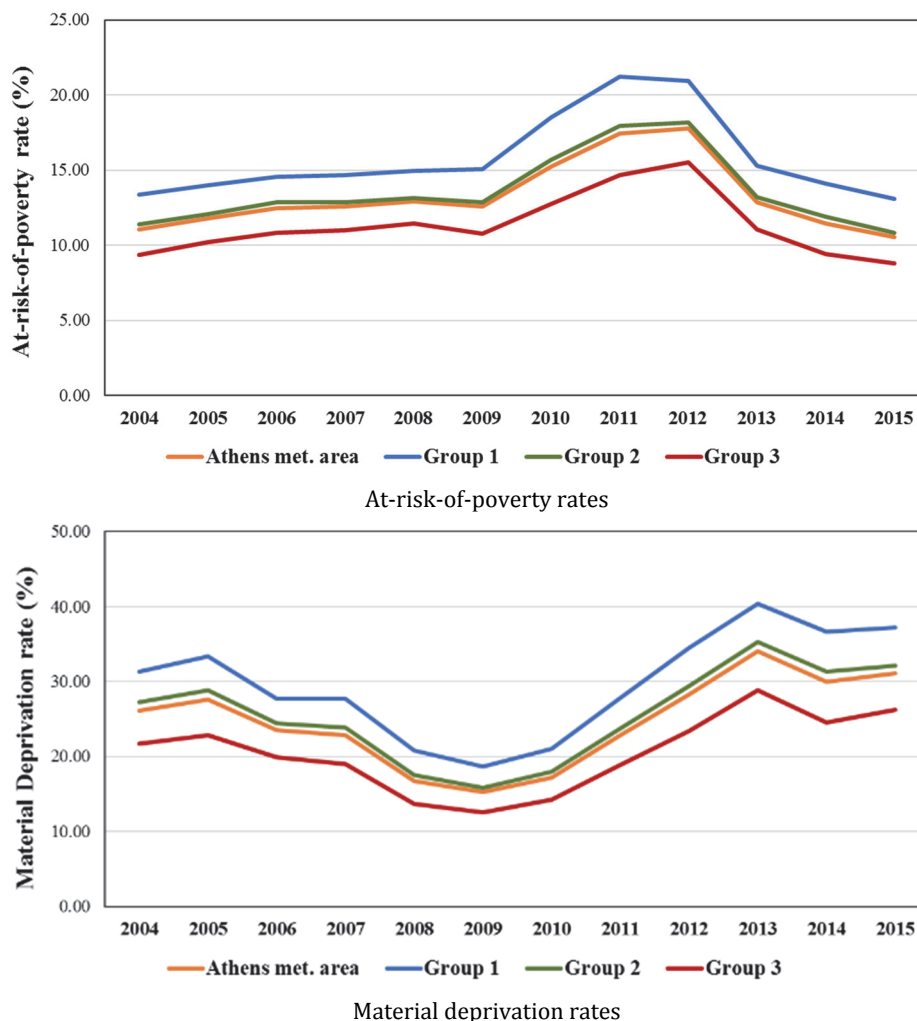
In terms of social inclusion, interesting findings arise when looking at the evolution of at-risk-of-poverty rates and material deprivation for each cluster group separately, throughout the period 2004-2015. Already having gained some initial insights regarding the overall evolution of these social inclusion measures (Fig. 3), Figure 7 indicates that all three groups of municipalities follow the same pattern with the overall metropolitan area of Athens. In the case of at-risk-of-poverty rates, the period between 2004 and 2009 is characterized by a stability in poverty rates, whilst a sharp increase is recorded in the following 3 years (2009-2012). Finally, Figure 7 shows that during the period 2012-2015, there is a gradual decline in the poverty rates, in all sub-groups of municipalities. Nonetheless, a diversified pattern exists in the case of material deprivation. In this case, the gradual decrease of material deprivation values between 2004 and 2009 is followed by an intense rise in this indicator until 2013, when there seems to be a relative stabilization of its values until 2015, when a slight decrease occurs. It should also be noted that patterns in this case do not differ between different cluster groups of municipalities.

At this point, it is interesting to highlight possible explanations for the existing differing patterns between at-risk-of-poverty and material deprivation. The most important of them consists of the different nature of these two measures. At-risk-of-poverty rates have been calculated using different poverty thresholds for each year, whereas material deprivation constitutes an anchored measure for social inclusion, whose cut-offs do not change over time. This is a critical difference between these two indicators, since in the first case we reap evidence regarding the relevant evolution of poverty, emphasizing mostly each year separately, whilst the latter case illustrates a more conspicuous picture regarding the evolution of poverty levels throughout time.

Regarding the existence of convergence in terms of income and social inclusion indicators between the 59 Athenian municipalities, we investigated the period 2004-2015. Results regarding the IPS panel unit-root tests in terms of mean equivalised income, at-risk-of-poverty rates and material deprivation are presented in Table 2 and give us a rich set of information.

Figure 7: Evolution of at-risk-of-poverty rates and material deprivation calculated for the total number of municipalities within the metropolitan area of Athens and for each cluster group separately

At-risk-of-poverty rates

Material deprivation rates

Source: Authors' calculations.

When looking at the results referring to the overall metropolitan area of Athens, it becomes evident that throughout the whole period under investigation there is a convergence trend between the municipalities, not only in terms of income, but also for all the other social inclusion indicators, at-risk-of-poverty rates and material deprivation. At the same time, insights within each cluster group separately also provide useful information. The null hypothesis is rejected for income and poverty rates in the case of low-income areas, pointing to an inter-municipality convergence trend. However, this is not so for material deprivation. At the same time, medium-income areas indicate convergence during this period only in terms of mean equivalised income, whilst the null hypothesis for the panel unit root test is not rejected in the social inclusion indicator case. For Groups 3, encompassing the high-

income areas of Athens, we can see that there is a full convergence trend for all in-dicators.

It is interesting to note that income convergence is achieved in all cases investi-gated. Within all groups, distribution of income becomes more concentrated around specific values, a fact which was also illustrated as a preliminary insight in Figure 5, where the span of the Kernel diagrams declined between 2009 and 2012. However, this is not so when applying the analysis in separate clusters and using social inclu-sion indicators, such as material deprivation. The group of municipalities belonging to the higher-income cluster is the only one that indicates a convergent trend in all cases.

Table 2: IPS panel unit-root tests for mean equivalised income at a municipal level

		Mean income	At-risk-of-poverty rate	Material deprivation
Athens met. Area	Panel IPS-tbar	-5.641	-2.750	-5.708
	p-value	(0.000)	(0.003)	(0.000)
Group 1 Low-income areas	Panel IPS-tbar	-3.547	-2.150	-1.392
	p-value	(0.000)	(0.016)	(0.082)
Group 2 Medium-income areas	Panel IPS-tbar	-5.652	-1.375	-1.375
	p-value	(0.000)	(0.085)	(0.085)
Group 3 High-income areas	Panel IPS-tbar	-3.287	-3.395	-2.091
	p-value	(0.001)	(0.000)	(0.018)

Source: Authors' calculations.

Overall, by looking at the empirical results, we can say that within the metropol-itan area of Athens there is an inter-municipality convergence trend of both eco-nomic and social conditions throughout the period under investigation (2004-2015). As expected, the inter-municipality convergence phenomenon is stronger in terms of social inclusion indicators between high- and low-income municipalities, which cover the two tails of the income distribution. Low- and medium-income mu-nicipalities show a stronger convergence trend in terms of income, signaling that there has been a significant shift in income distribution in these areas.

4. CONCLUSIONS AND DISCUSSION

The present analysis highlights some essential insights regarding the evolution of some basic socio-economic variables during a period of economic crisis which has also been characterized by the implementation of severe fiscal reforms and auster-ity policies. A key part of the analysis was to consider parameters that embody as-pects of the economic, as well as the social development of the regions and investi-gate these throughout pre- and post-crisis periods. By choosing income, at-risk-of-poverty and material deprivation rates as the main socio-economic indicators and illustrating their evolution over time, clear evidence has been found regarding the effect of the 2008 economic crisis and its derivatives on these parameters has.

According to the findings, the Athens metropolitan area seems to have experi-enced a severe deterioration in terms of income conditions. However, despite the sharp decrease in income between 2010 and 2012, a slight recovery after 2012 seems to be taking place. When exploring inter-municipality income distribution in more detail, we can see that there is a diversified pattern between low, medium and

high-income areas. Income segregation in rich areas remains unchanged before and after the start of the economic crisis, whereas the normal distribution of income in disadvantaged areas seems to be highly distorted after 2009. The medium income group of municipalities is not affected by the economic crisis effect. In terms of income inequality, its gradually decreasing trend is reversed after 2011, leading to higher levels of income disparities between municipalities in Athens.

At the same time, at-risk-of-poverty rates illustrate an upward movement, which sharpens especially after 2009. However, during the period 2013-2015 there seems to be an essential decrease in the values of this measure. This in fact is an interesting finding, as it shows the rationale behind the structure of non-anchored at-risk-of-poverty shares. More specifically, the overall decline in income levels, observed after 2010, started to affect a broader range of the population after 2012, leading to lower levels of at-risk-of-poverty thresholds. Thus, due to the fact of having lower poverty thresholds, a smaller percentage of the population is poor, and as a result at-risk-of-poverty rates indicate decreasing values after 2013. On the other hand, material deprivation, being an absolute measure of poverty, shows a different behavior. More specifically, although the percentage of materially deprived people seems to shrink during the first half of the time span, its values start to increase significantly after 2009, reaching a peak in 2013. This peak continues to exist until 2015. The same pattern is also recorded for all the three clusters derived within the metropolitan area of Athens, with low income areas illustrating the highest levels of material deprivation, which was of course to be expected.

This study also tests for the presence of inter-municipality convergence trends, within the urban area of Athens. The results indicate that there is a general convergence trend in all three socio-economic indicators throughout the period 2004-2015 for the metropolitan area of Athens. However, when we cluster municipalities into three groups, the evidence shows that convergence mostly appears in low- and high-income areas. Moreover, the null hypothesis of the unit-root testing is more firmly rejected in the case of these groups of municipalities, meaning that there is stronger evidence supporting inter-municipality convergence in these cases.

The previous results indicate that during the 2004-2015 period, economic and social conditions in Athens worsened. This deterioration is a result of the still ongoing severe economic crisis on the one hand, in combination with the implementation of severe fiscal reforms and austerity policies during the last years in Greece.

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L'impact de la crise économique sur la richesse et la pauvreté à Athènes

Résumé - Cet article propose d'étudier l'impact de la crise économique de 2008 et des mesures d'austérité engagées par le Gouvernement grec sur les revenus et la pauvreté des habitants, et selon les 59 municipalités de résidence de l'aire urbaine d'Athènes. Ce travail mobilise une base de données originale sur les plans économique, démographique et social pour les municipalités d'Athènes entre 2004 et 2015. Les résultats montrent que la crise économique a eu un impact négatif sur les revenus et la pauvreté des habitants mais qu'elle a également conduit à un creusement des inégalités entre les municipalités. La crise a augmenté la vulnérabilité des habitants dans les municipalités économiquement les plus fragiles mais n'a pas fondamentalement modifié leur hiérarchie, classées selon la richesse de leurs résidents, ce qui signifie que la ségrégation sociale et la polarisation spatiale sont des phénomènes persistants dans le temps au sein de l'aire urbaine d'Athènes.