



SAPIENZA
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Ph.D THESIS

“Essays on the middle class”

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Introduction

The concept of “class” has received considerable attention in the social sciences but it has been used in many different ways.

Wright (2005), the analytical Marxist sociologist, identifies five different theoretical approaches to class analysis in sociological literature through five questions:

- How do people, individually and collectively, locate themselves and others within a social structure of inequality?
- How are people objectively located in distributions of material inequality?
- What explains inequalities in economically-defined life chances and material standards of living of individuals and families?
- How should we characterise and explain the variations across history?
- What sorts of transformations are needed to eliminate economic oppression and exploitation within capitalist societies?

Some of these questions are investigated in the Marxist and Weberian theoretical traditions. Indeed, within the Marxist tradition of class analysis, class is defined in terms of common structural positions within the organisation of production, where class stratification is based on the concept of exploitation and property relations (Wright, 1979; Wright, 1997). In contrast, the Weber-inspired tradition of class analysis (Giddens, 1973; Parkin, 1971; Scott, 1996) bases the definition of class in terms of market-determined life chances (Wright, 2005).

Most contemporary approaches, in part on the basis of empirical studies, consider class positions as resulting from social relations in economic life or, more specifically, from relations of employment. The Goldthorpe class scheme (Erikson, Goldthorpe, and Portocarrero, 1979; Erikson and Goldthorpe, 1992) based on occupational structure is probably the most widely used in European sociology. Goldthorpe and his colleagues propose a chart which is said

“to combine occupational categories whose members would appear, in the light of the available evidence, to be typically comparable, on the one hand, in terms of their sources and levels of income, their degree of economic security and chances of economic advancement; and, on the other hand in their location within the systems of authority and control governing the processes of production in which they are engaged, and hence in their degree of autonomy in performing their work-tasks and roles” (Goldthorpe, 1980).

Nevertheless, social class also refers to social status, meaning place in a social hierarchy based on life opportunities, life-styles and attitudes (see Bourdieu 1984, 1987).

Treiman (1977) provides a stratified model of classes based on occupational prestige and developed the Standard International Occupational Prestige Scale, which assigns prestige scores to occupations based on evaluative judgments on their general desirability.

Furthermore, a huge number of authors (Hodge and Treiman, 1968; Jackman and Jackman, 1973; Wright and Singelmann, 1982) emphasise the role of individuals’ perceptions of their position in society in their analysis of social classes. These sociologists argue that no consideration of social class is comprehensive without tak-

ing into account a person's sense of self, as it may not coincide completely with an objective reality but is likely to affect behaviour and choices.

Assuming that there are not any insurmountable or even clear distinctions between the social sciences, it can be claimed that a proper analysis of social classes in economics must consider multiple dimensions.

Nevertheless, economic literature often ignores many factors related to the classical and sociological approaches of class and opts for analysis based on statistically measurable characteristics such as income and consumption: despite wide acceptance of the sociological conceptualisations of class, in general economists only consider relative definitions and use the term "class" addressing a stratum of the income distribution rather than an analysis of the notion "class".

In particular, this path has been followed in the empirical approaches which attempt to identify and measure the middle class.

Firstly, it is important to point out, as obvious as it may seem, that the consideration of the middle class implies that i) classes are considered as relevant actors in the social structure and ii) the presence of two extreme classes with respect to which one or more other classes occupy a middle position is assumed.

As underlined by Pichierri (2008), the term "middle class" finds its origins in the nineteenth century when it became commonly used as a synonym for entrepreneurial bourgeoisie to indicate the class that according to income, prestige and power occupies an intermediate position between the aristocracy and the proletariat. Then, following the gradual deterioration of the relative position of the old ruling class and its replacement by a new entrepreneurial class, the term "middle class" passed to indicate that social group whose members belong neither to the bourgeoisie nor the proletariat but are placed between them, occupying an important dimension of social stratification (Pichierri, 2008).

Nowdays, however, with some remarkable exceptions, talking about social classes amounts to improper and impolite behaviour among the economists, and if they are considered, what is usually meant is an aggregation of ‘agents’ on the basis of income quantiles (Corsi and D’Ippoliti, 2013).

Furthermore, as declared by Atkinson and Brandolini (2013), “a certain penumbra” persists around the definition of the middle class. Also adopting an income-based definition of the middle class, there is no consensus on how to measure and identify it.

Nevertheless, the presence of a large middle class is considered by several authors as an important determinant of democracy, social stability and economic growth both in the United States and in Europe, but also in many developing region. The idea that the middle class is a stabilising force can be traced back at least to Aristotle. In *The Politics*, Aristotle discusses the virtues of the middle class and how it can balance the vices of the two extreme classes (i.e. the rich and the poor). More recently, Adelman and Morris (1967), Landes (1998), Pressman (2007), Estache and Leipziger (2009), Littrell, Brooks, Ivery and Ohmer (2010) and many others researchers emphasise the role of the middle class for the development of democracy, social cohesion, economic prosperity and political stability. Among them, Easterly (2001) defines “middle-class consensus” as high share of income for the middle class and the absence of strong ethnic divisions. This “consensus” facilitates growth by affecting stability, human capital accumulation, and better infrastructure.

Furthermore, since 1980s and especially since we entered in the 2000s there has been the increasing perception that the middle class in Europe and the United States has been shrinking. At the heart of the fear, well documented by media articles and reports, is the sensation for those who define themselves as middle class that the difficulty to maintain previous standard of living is significantly rising.

The presumed shrinking of the middle class has led to a growing attention by research to this topic. As well synthesised by Pressman (2007) the decline of the middle class observed in some countries can be imputed to different factors:

- demographic factors;
- structural or microeconomic factors¹ (e.g. skill biased technological change and the decline of labor unions);
- macroeconomic factors (e.g. unemployment resulting from the business cycle);
- changes in public policies.

However, since economic studies design different definitions of middle class, the empirical evidence can be confusing. Results are driven by the choice of the middle class measure adopted and vary across different alternatives.

Hence, the main research questions this thesis tries to answer are the following:

1. What are the limits of the traditional approach adopted in economics to identify and measure the middle class?
2. How can recent research approaches foster the overcoming of the limited concept of the middle class traditionally adopted in economics?
3. What is the role of mobility and self-perception for a deeper analysis of the middle class?
4. What empirical evidence can be provided regarding the Italian middle class?

¹See Goos et al. (2009), Goos and Manning (2007), Oesch and Rodriguez Menes (2011). See e.g. Autor et al. (2006) on the US, and Beach et al. (1997) who directly link the shrinkage of the middle class with the increase in earnings polarization.

Chapter 1 addresses the first two questions. First, it critically reviews the most common definitions of the middle class adopted by the literature based on disposable income distributions. Second, even if considering a single quantitative characteristic such as income, it provides an integrated theoretical framework to analyse the middle class, emphasising the useful insights of the evolving research field on polarization.

Applying this framework, the empirical analysis proposed in Chapter 2 is aimed at evaluating the evolution of the middle class in Italy since the beginning of the nineties, and with a focus on the period before and after the beginning of the financial crisis.

Furthermore, since the consideration of the middle class requires the investigation of multiple dimensions, to expand the study of this stream of research in economics, other relevant dimensions are explored from a theoretical and empirical point of view.

Chapter 3 is concerned with the analysis of mobility which is a crucial aspect able to provide a more complete understanding of the condition of the middle class. Indeed, in recent years, there has been an increasing attention to the connection between the concepts of economic stability and security and the middle class.

Then, in Chapter 4, to further explore what lies behind the concept of middle class, we introduce the consideration of subjective perceptions of position across society as the sense of identity affects economic outcomes and well-being.

Finally, final remarks concludes this work.

Chapter 1

An integrated framework for the analysis of the middle class

1.1 Introduction

The role of middle class has always been considered important especially for democracy and economic growth but the concept of middle class is defined and measured differently by social researchers. Most of the economic literature considers classes strictly on the basis of relative definitions through a specific stratum of the income distribution, without basing this identification on sound theoretical assumptions and on agreed criterion on how to define the middle class.

This Chapter attempts to challenge this vision expanding the conceptual and theoretical repertoires in the study of middle class groups in economics considering the insights of the evolving research field on polarization, a phenomenon which concerns the disappearance of the middle class.

Section 2 proposes a literature review on traditional approaches which aim to measure the middle class in modern societies. Specifically, a critical analysis of the most commonly adopted definition of the middle class is put forward, identifying its limits.

The aim of this Chapter is therefore to emphasise the potential of the insights

of polarization studies, to provide the theoretical and empirical instruments to study the dimension and the evolution of the middle class without the arbitrariness common to the traditional approaches.

In this respect, Section 3 offers a short outline of how the frameworks developed to study polarization may serve this purpose, presenting core definitions and measurement issues. In so doing, the relevance of the possibility to include different dimensions beyond income in the analysis of the middle class, in particular of sociological factors, is pointed out.

Finally, Section 4 summarises the main points and concludes.

1.2 Traditional approaches for the analysis of the middle class

Class as a concept has evolved over time, taking on various meanings at different points throughout history. Nevertheless, economic classes are broadly identified by distinguishing the people who are at the top, bottom or middle of the distribution of a particular indicator. These classes rely on the ad hoc definition of boundaries since income distributions differ across countries.

According to Foster and Wolfson (1992), most attempts at “measuring the middle” proceed with four distinct steps: (1) choosing the “space”, (2) defining the middle, (3) fixing the range, and (4) aggregating the data. In general, the space chosen is income space, where income can have different declination (monthly salary, yearly expenditure etc.), or people space, considering percentiles.

Within this income-based framework, one approach establishes an interval defined by percentages of median household income. Commonly middle class is identified with those households with income between 75 and 125 percent of the national

median, as suggested by Thurow (1984) and chosen by Birdsall, Graham and Pettinato (2000), Pressman (2007) and Ravallion (2010).

Furthermore, also different intervals are drawn. For example, in one of the first studies in this field, Blackburn and Bloom (1985) selected the middle income range of 60-225 percent around the median to examine the size and characteristics of the middle class in the United States from 1963 to 1983. Frick and Grabka (2013) chose 70 to 150 percent of the median equivalent income, whereas Kristjánsson and Ólafsson (2013) selected 75 to 150 percent of the median income in their study on Iceland. This latter range was also used by Wolfson (1989) on labor income. Chauvel (2013) selected 75 to 250 percent, while Vanneman and Dubey (2013) used 50 to 200 percent in their study of India where the distribution is very skewed.

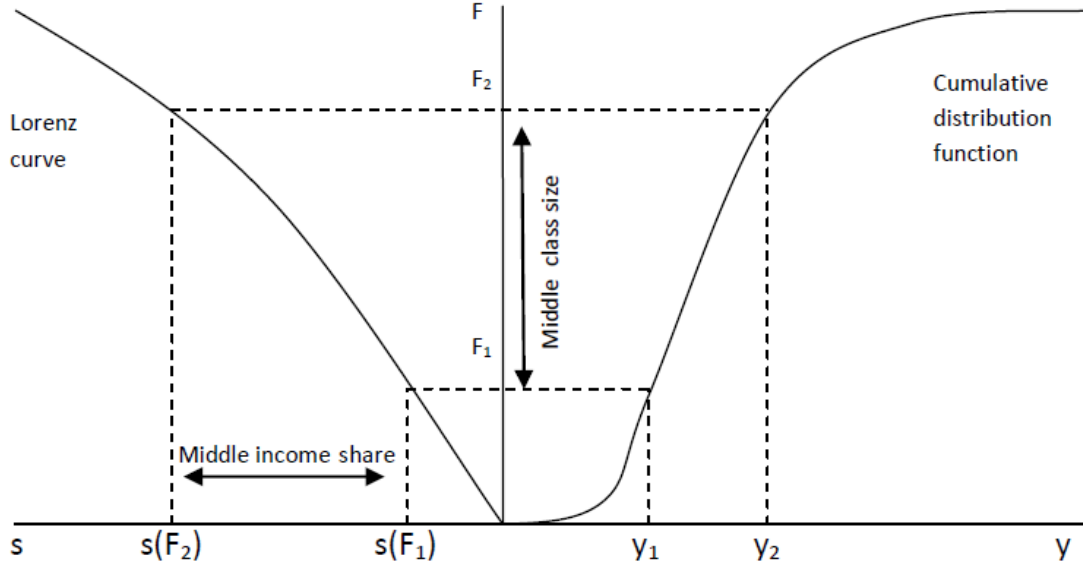
On the one hand, an advantage of these kind of measure is that the size of each group is sensitive to changes in the distribution of income, both in terms of growth and in terms of changes in the underlying dispersion of the distribution (Cruces, López Calva and Battiston, 2011). Furthermore, this family of definitions permits comparisons of the income share and the size of each groups over time. On the other hand, the same disadvantages as relative poverty measures emerge¹. This is because the choices of the central tendency and of upper and lower boundaries are arbitrary (Foster and Wolfson, 1992).

Another approach to identify the evolution of the middle class is based on percentiles of the income distribution. Levy (1987) Partridge (1997) and Barro (1999) define the middle class as the middle three quintiles of the family income distribution.

Similarly, Easterly (2001) identifies the “middle class” with those lying between the 20th and 80th percentile on the consumption distribution. Other studies (Alesina and Perotti, 1996; Deininger and Squire, 1996) restrict the definition of middle class

¹See Foster and Shorrocks, 1988.

Figure 1-1: Income distribution function and the middle class



to the share of the 3th and 4th quintiles of the population.

Furthermore, Solimano (2008) uses a relative-income definition of middle class that corresponds to individuals belonging to deciles 3 to 9. This can be broken in two subcomponents, a lower-middle class, corresponding to deciles 3 to 6, and an upper-middle class, corresponding to deciles 7 to 9.

In this context, the use of the size of the middle class as a measure is pointless. Consequently, the share of income received by the middle class is considered as an alternative indicator.

Figure 1-1, derived from Foster and Wolfson (1992) and elaborated by Cruces, López Calva and Battiston, (2011) and Atkinson and Brandolini (2013), illustrates how the two types of definition (based on median income and on percentiles) are constructed.

Other economic definitions of middle income strata are based on absolute thresh-

olds. The most widely applied measure of this kind has been proposed by Milanovic and Yitzhaki (2002) who count as middle class individuals living with a per capita income on \$12–50 a day, in 2000 purchasing power parity terms (PPP). These thresholds are established on the basis of the mean per capital income level in Brazil (lower bound) and Italy (upper bound). Their analysis is on the national income expenditure distribution data from 111 countries and tries to count the “global middle class”. In order to compare different countries, with a similar methodology, Kharas and Gertz (2010) choose a range of \$10 and \$100 daily expenditure per person, excluding those individuals who would be considered poor in Portugal and Italy and rich in Luxemburg (the poorest and richest among the industrialised countries, respectively).

Moving to a developing countries perspective, a definition of the middle class based on absolute bounds seems more suitable. Banerjee and Duflo (2008) consider to be middle class all the households whose daily per capita expenditures valued at purchasing power parity are between \$2 and \$10. Ravallion defines a “developing world middle class” as those “who are not deemed poor by the standards of developing countries but are still poor by the standards of rich countries” (Ravallion, 2010). He fixes a range of incomes between the median poverty line of 70 countries in the developing world (\$2.00 per day at 2005 PPP) and the US poverty line (\$13 a day at 2005 PPP). Birdsall (2010) uses a hybrid definition and includes in the middle class those with income between \$10 a day (in 2005 PPP) and at or below the 95th percentile of the income distribution. She argues that \$10 a day implies a minimum level of economic security, relatively high if compared to the global poverty line of \$1.25 a day, although it is still low by OECD standards. On the other hand, the relative maximum aims to exclude that portion of the population within a country whose income is most likely to be from inherited wealth, economic

rents and privileges. For the Latin American and Caribbean (LAC) regions, a LAC-specific identification of \$10 to \$50 has been developed by a team of the World Bank (Ferreira et al., 2012).

The choice between these different approaches depends on the purpose at hand, but the central question is how the analysis of the middle class depends on the way it is defined.

Furthermore, a recent study by Atkinson and Brandolini (2013) not only insists that conventionally adopted approaches lead to a different picture of change over time of the evolution of middle, but also stress on the necessity to identify the middle class by re-integrating the analyses of personal incomes, position within the division of labor, and ownership structure. Their study considers the role of property, wealth and, drawing from the sociological literature, of occupations. The aim of these two authors is to expound meanings and interrelationships of these different notions and assess the extent of overlapping in the ensuing classifications.

Coherently with this view, the opportunity to apply different complementary tools to analyse the middle class comes out. In the next Section alternative methodologies for the analysis of the middle class drawn from polarization studies will be proposed. As pointed out by Borraz, Gonz  les Pampill  n and Rossi (2013) and Cruces, L  pez Calva and Battiston (2011), this literature contributes to identify and compare middle class without any arbitrary choices and it is able to combine income-based aspects with the roles played by different features.

1.3 Middle class and polarization

Most of the definitions of middle class reviewed in the previous section have been implemented to demonstrate that the population share in differently chosen middle income boundaries has fallen. However, much of the evidence presented in these

studies depends on the particular cutoffs selected.

The evolving research field on polarization, a related phenomenon which has been theoretically defined, conceptualised and explored by a significant number of authors and concerns the disappearance of the middle class (e.g. Foster and Wolfson, 1992; Esteban and Ray, 1994; Duclos, Esteban and Ray, 2004; Handcock and Morris, 1998, 1999) attempts to overcome this problem capturing the information contained in the distribution of income to state unambiguously if middle class increased or decreased over time.

Indeed, according to Foster and Wolfson (1992):

“the range defining the middle class is essentially arbitrary. For example, why use a range of 75% to 125% of the median income (as Thurow did) rather than 60% to 225%? Alternatively, why focus on the middle three-fifths of the population (as Levy did) instead of the middle fifth?” (Foster and Wolfson, 1992).

Consequently, starting with the contributions of Foster and Wolfson (1992), Esteban and Ray (1994), and Wolfson (1994, 1997), different polarization measures which try to avoid conflicting results have been conceptualised (Wang and Tsui, 2000; Chakravarty and Majumder, 2001; Zhang and Kanbur, 2001; Anderson, 2004; Duclos, Esteban and Ray, 2004; Esteban, Gradín, and Ray, 2007; Chakravarty and D’Ambrosio, 2010).

In these studies polarization is related but distinct from inequality as demonstrated by Esteban (2002), Duclos, Esteban and Ray (2004), and Lasso de la Vega and Urrutia (2006). Indeed, inequality considers the overall dispersion of the distribution, whereas polarization measures aim to explore whether it is possible to observe “the appearance of groups in a distribution” (Chakravarty, 2009) and to capture the

gap between those at the top and those at the bottom of society in developed nations. This is due to the grouping of community members around more than one pole and their consequent distancing from the middle, according to specific characteristics (e.g. income levels, occupational skills and wages).

The systematic classification of Esteban and Ray (2012) distinguishes two different approaches to conceptualise and measure polarization.

The first approach assumes that there may be an arbitrary number of groupings (or poles) in a distribution. It was proposed by Esteban and Ray, and it was fully axiomatised by Duclos, Esteban and Ray (2004) in the case of continuous distributions, and by Esteban and Ray (1994) in the case of discrete distributions.

The second approach considers polarization as the process by which a distribution becomes “bi-polar”. It measures the division of a society into two groups with the median value as a cut-off. Indices of this family are developed in Foster and Wolfson (1992), Wolfson (1994), Wang and Tsui (2000).

According to Esteban and Ray (2012), these different views are based on similar patterns:

- polarization depends on groups so that when there is one group only polarization is not observable;
- polarization raises when “within-group” inequality is reduced;
- polarization rises when “across-group” inequality increases.

These claims make clear that the assumption of discontinuity between social categories is a crucial element. It assumes that there exists a number of clearly distinguishable social categories whose members differ from members of other categories (external heterogeneity) and are relatively similar to other members of the

same category (internal homogeneity) along with a series of socioeconomic indicators (Ganzeboom, De Graaf and Treiman, 1992; Cruces, López Calva and Battiston, 2011).

In particular, the theoretical analysis of Esteban and Ray (1994) defines polarization as the interaction between the identification and alienation that each individual feels with respect to the rest. The identity-alienation framework developed by these two authors points out that many individual attributes are relevant for creating differences and similarities between persons, coherently with classical studies on social classes. Indeed, the coexistence of a high level of homogeneity within each group and a high level of heterogeneity between groups can generate social tensions, revolution and revolt, and social unrest in general. These studies aim to obtain a synthetic measure of polarization and can be applied to identify the relative position of middle groups and observe its changes over time.

Similarly, other methodologies which lack of arbitrariness and are able to investigate the disappearing of the middle class hypothesis have been proposed by Jenkins (1995) and Massari, Pittau and Zelli (2009). The first mentioned author suggests to examine the changes in the relative concentration of people at each income level using Kernel density estimation methods. The latter apply the relative distribution approach introduced by Handcock and Morris (1998) to identify at the same time the location effects (jumps of the average and of the median) and the shape effects (changes in variation, skewness and higher moments) occurring along the income distribution between two populations. In both cases, decomposition of results by family socioeconomic groups (e.g. considering sources of income, employment status, type of contract, occupational activity of the head of the household and so on) permits an analysis which considers multiple dimensions.

Hence, the efficiency of defining and analysing middle class on the basis of these

endogenous approaches easily emerges.

In the next Subsections, a more detailed presentation of these methodologies will be proposed. The aim is to identify all the relevant aspects that may contribute to a rigorous analysis of the middle income groups.

1.3.1 The bi-polarization approach

Foster and Wolfson (1992) provided important tools to analyse the income distribution and evaluate unambiguously if middle class has increased or decreased over time. They identified two different aspects of polarization, the “increased spread” and the “increased bipolarity”.

The first is a movement away from the middle whereas the second involves an increasing concentration around each center. Their method is based on partial ordering and their associated curves which permit to graphically identify if a distribution has a larger middle class and/or a wider distance between groups than another without fixing any income boundaries.

The first step of their analysis considers income space to measure the middle class over time.

Hence, let m be the middle of the income distribution measured by the median. According to many authors members of the middle class are those with an income between $m - \varepsilon$ and $m + \varepsilon$. But comparisons over time depend on the type of measure chosen and by varying the measure ε the dynamics of middle class may be considerably different.

Given F an income distribution function in one period, since different distribution functions might have different median, a median-normalised F denoted as \tilde{F} is considered to make robust comparison between two or more distributions.

Generally a middle class index for \tilde{F} given an income range $R = [\underline{\varepsilon}, \bar{\varepsilon}]$ is defined as:

$$M_{\tilde{F}}(R) = M_{\tilde{F}}(\underline{\varepsilon}) + M_{\tilde{F}}(\bar{\varepsilon}) = [\tilde{F}(1) - \tilde{F}(\underline{\varepsilon})] + [\tilde{F}(\bar{\varepsilon}) - \tilde{F}(1)] \text{ with } 0 \leq \underline{\varepsilon} \leq 1 \leq \bar{\varepsilon} \quad (1.1)$$

where $\tilde{F}(1) = 0,5$. In this way considering different income ranges it is possible to construct a curve $M_{\tilde{F}}(R_i)$ with $i = 1, \dots, n$ that is not restricted to any particular definition of the middle class.

So, considering two distributions F and G the following binary relation can be established:

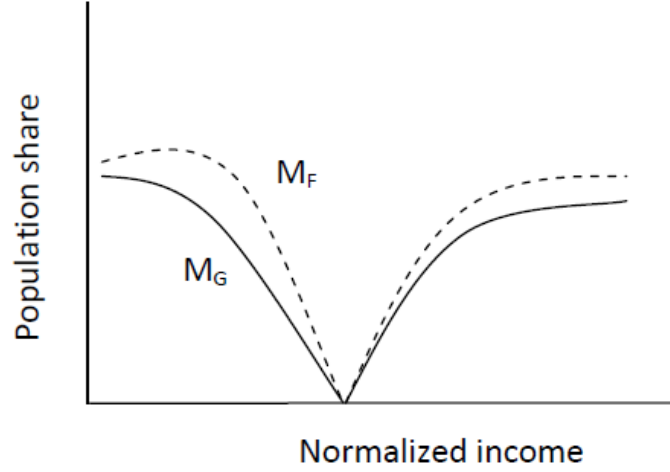
Proposition 1 $FMG \Leftrightarrow M_{\tilde{F}}(R_i) \geq M_{\tilde{G}}(R_i) \forall i = 1, \dots, n$ and $M_{\tilde{F}}(R_i) \geq M_{\tilde{G}}(R_i)$ for some i

It means that “ F has an ambiguously larger middle class than G ” for any definition of the middle class and, using the notion of stochastic dominance, we can obtain the following formalisation:

Proposition 2 If 1) $\tilde{F}(\varepsilon) \leq \tilde{G}(\varepsilon) \forall \varepsilon \leq 1$ and 2) $\tilde{F}(\varepsilon) \geq \tilde{G}(\varepsilon) \forall \varepsilon \geq 1 \Rightarrow FMG$

These two conditions imply that $\tilde{F}(\varepsilon)$ stochastically dominates $\tilde{G}(\varepsilon)$ for all $\varepsilon \leq 1$ and $\varepsilon \geq 1$, which means that the first distribution accumulates more mass around its median.

In this way the estimation of the M-curve for different distributions and its graphical representation (figure 1.2) can be very useful tools of analysis to measure the middle class (Foster and Wolfson, 1992; Borraz, Gonz  les Pampill  n and Rossi, 2011). Indeed, if the estimated M-curves do not cross in any part of the distribution, a higher M-curve reveals a larger middle class.

Figure 1·2: M curves

Source: Foster and Wolfson (1992)

Otherwise, it is possible to identify the precise locations where crossing takes place and identify the different income ranges that support prior definitions.

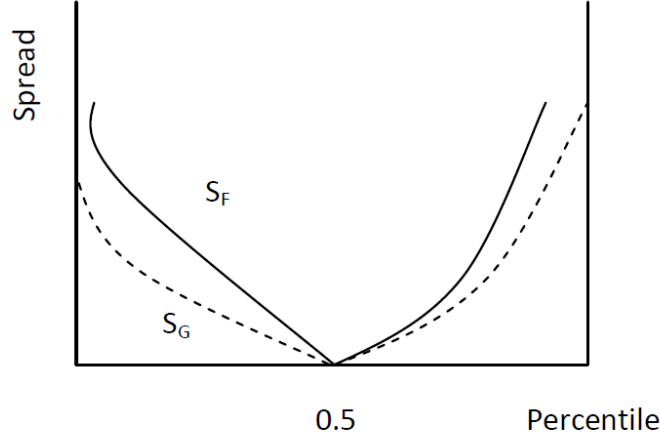
In the second part of their analysis, Foster and Wolfson (1992) recur to partial ordering to fully reflect the spread and bipolarity aspects connected to their definition of polarization.

Their first aim is to find out the income interval that includes all the households belonging to a given population range.

Indeed, for any distribution to a given population range $Q = [\underline{q}, \bar{q}]$ which satisfies $\underline{q} \leq 1 \leq \bar{q}$ corresponds a certain income range $R = [\underline{z}, \bar{z}]$ satisfying $\underline{z} \leq 1 \leq \bar{z}$. Greater is the income range required to quantify any defined population range, greater is the income spread. Consequently, income spread can be measured as the width of the income range in the distribution F given a population range.

Formally the first degree polarization curve (figure 1·3) of a distribution F is defined by:

Figure 1.3: First degree polarization curves (S curves)



Source: Foster and Wolfson (1992)

$$S_F(q) = |\tilde{y}(q) - \tilde{y}(0.5)| = |F^{-1}(q) - F^{-1}(0.5)|/m_F \quad \forall q = 1, \dots, n \quad (1.2)$$

where for each q , $S_F(q)$ represents the distance between the median and the median normalised income of the person at the q^{th} percentiles $F^{-1}(q)$.

Then, using the notion of partial ordering, the proposition 3 is derived:

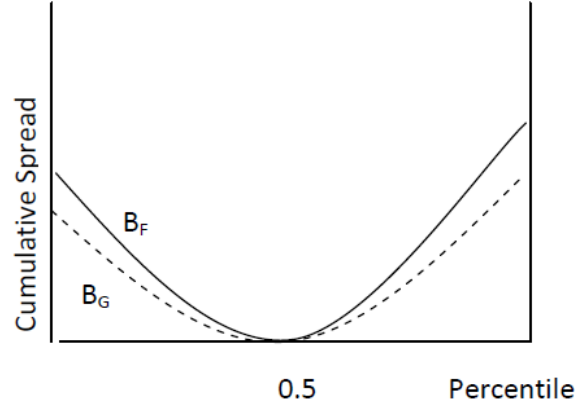
Proposition 3 $FSG \Leftrightarrow S_F(q) \geq S_G(q) \quad \forall q$ and $S_F(q) > S_G(q)$ for some q

It means that for a given population range q the income distribution F has a greater income spread than G . Because the polarization curve of one distribution is higher when its M-curve is lower than the other distribution's M-curve, we have that:

Proposition 4 $FSG \Leftrightarrow GMF$

Then, in order to consider at the same time increased spread and increased

Figure 1.4: Second degree polarization curves (B curves)



Source: Foster and Wolfson (1992)

bi-polarity, Foster and Wolfson constructed another curve, the “second degree polarization” (figure 1.4).

It measures the area under the first polarization curve S between 0.5 and q and it is similar to the Lorenz curve because it accumulates income spread from the middle to the top and the bottom, placing more weights on changes around the middle of the income distribution.

$$B_F(q) = \left| \int_q^{0.5} S_F(p) dp \right| \text{ for } 0 \leq q \leq 1 \quad (1.3)$$

When the distribution F has a higher polarization than G , the following proposition holds:

Proposition 5 $FBG \Leftrightarrow B_F(q) \geq B_G(q) \forall q$ and $B_F(q) > B_G(q)$ for some q

Consistently with the first and second polarization curves, Foster and Wolfson finally derive a synthetic index of bipolarization (because it is focused on the idea

that only two income groups exist) similar to the Gini index. It is defined as twice the area under the second degree polarization curve $P = \int_0^1 2B_F(q)dq$. Considering the distance between the two groups (the one above and the one below the median) as the relative median deviation: $T = (\mu^U - \mu^L)/\mu$ where μ^U is the mean of those above the median, μ^L is the mean of those below and μ is the overall mean, it can be proved that: i) $T = 2G^B$, where G^B is the between group Gini index; ii) $G = G^B + G^W$ where G^W is the within group Gini index; iii) the polarization index is equal to $P = (T - G)\mu/m$, where m is the mean.

So the following equation can be obtained:

$$P = (G^B - G^W)\mu/m \quad (1.4)$$

It reflects the fact that, on the one hand, an increment in inequality between the two groups raises polarization but, on the other hand, an increment in inequality in each group decreases polarization.

1.3.2 The identity-alienation framework

As previously said, a different approach to polarization is based on the “alienation-identification” framework developed by the stream of research pioneered by Esteban and Ray (1994) and later extended in the work of Duclos, Esteban and Ray (2000) and of Esteban, Gradín, and Ray (2007). In the following Subsections some developments and indices within this framework will be briefly reviewed.

The Esteban and Ray (1994) index

According to theoretical studies of Esteban and Ray (1994), a population of individuals may be grouped according to some vectors of characteristics into “clusters”, such that each cluster is very homogeneous in terms of the attributes of its members,

but many dissimilarities are observable between different clusters.

The feeling of *identification* and *alienation* are expressed through two different functions.

The *identification function* indicates the attitude that any individual in a given group i has towards an individuals in the same income group. It can be formally described as: $I : \mathbb{R}_+ \rightarrow \mathbb{R}_+$, with $I(\pi_i) > 0$ for every $\pi_i > 0$, continuous and increasing function of the share of individuals π_i in the group i .

The *alienation function* is defined as $a : \mathbb{R}_+ \rightarrow \mathbb{R}_+$, continuous and non decreasing function with $a(0) = 0$.

The sense of alienation that an individual y_i feels towards another one y_j , is defined as: $a(\delta(y_i, y_j))$, where $\delta(y_i, y_j)$, indicates the absolute distance between the individuals with different incomes y_i and y_j .

The polarization measure aims to capture the “effective antagonism” that an individual with income y_i feels towards individual with income y_j . The effective antagonism is the combined result of the alienation and the identification function.

The effective antagonism is expressed by $T(I, a)$, strictly increasing function in a whenever $(I, a) >> 0$ and it is assumed that $T(I, 0) = 0$ which indicates that the effect of an isolated individual is not to be considered relevant. So, the total polarization is the sum of all the effective antagonisms amongst the individuals belonging to different groups:

$$P(\pi, y) = \sum_{i=1}^n \sum_{j=1}^n \pi_i \pi_j T(I(\pi_i) a(\delta(y_i, y_j))), \quad (1.5)$$

From the general form, the authors derive the index P^{ER} (Esteban and Ray, 1994):

$$P_{\alpha}^{ER} = K \sum_{i=1}^n \pi_i^{1+\alpha} \pi_j |\mu_i - \mu_j|, \quad (1.6)$$

It satisfies specific axioms and combines the sense of group identification (π_i^{α}) with the “between groups” alienation expressed as distance between the average income of each group ($|\mu_i - \mu_j|$).

The product between the two indicates the effective antagonism felt from each individual of group i , towards the individuals of group j . The extent to which identification affects the effective antagonism is expressed by the parameter α which varies between 0 and 1.6. It indicates how much weight is assigned to the effect of within-group identification. When $\alpha = 0$, P^{ER} is equal to the Gini index. K is a constant used for population normalisation.

The index P^{ER} is based on a discrete, finite set of income groupings located in a continuous space of different income values. This implicates two main drawbacks: firstly this measure is discontinuous because it is based on a continuous distribution that has been turned into discrete (income grouped in poles) and, secondly it requires the analyst to choose the number of groups and where to locate them. Thus, the problem is that each n -group representation of a continuous variable y generates an inaccurate approximation of the original distribution.

The Esteban, Gradín, and Ray (2007) index

Esteban, Gradín, and Ray (2007) proposed an extension of the original measure, which tries to overcome this problem by setting the “optimal” partition for a given number n of groups. Basing on the assumption that an income distribution can be represented by a density function f in a bounded interval, the function f can be

represented with an “n-spike” distribution denoted ρ .

The difference between f and ρ is the error term $\varepsilon(f, \rho)$ which is the “measure of error” caused by the n -group representation. It can be defined as $G(f) - G(p^*)$ where $G(f)$ is the Gini index obtained from the actual density function and $G(p^*)$ is the one deriving from optimally separating the population in defined n number of groups. Minimising the within-group dispersion using an iterative procedure, the new polarization measure is obtainable:

$$P_{\alpha}^{EGR} = (f; \alpha, \beta) = P^{ER}(\alpha, \rho) - \beta\varepsilon(f, \rho) \quad (1.7a)$$

$$P_{\alpha}^{EGR} = (f; \alpha, \beta) = \sum_{i=1}^n \sum_{j=1}^n \pi_i^{1+\alpha} \pi_j |\mu_i - \mu_j| - \beta\varepsilon(f, \rho) \quad (1.7b)$$

$$P_{\alpha}^{EGR} = (f; \alpha, \beta) = \sum_{i=1}^n \sum_{j=1}^n \pi_i^{1+\alpha} \pi_j |\mu_i - \mu_j| - \beta[G(f) - G(p^*)] \quad (1.7c)$$

As suggested by Borraz, Gonz  les Pampill  n and Rossi (2011), this process can be applied to identify lower, middle and upper class fixing $n = 3$, because it allows to calculate the optimal income boundaries that separate each group from the others.

The Duclos, Esteban and Ray (2004) index

Also the extension proposed by Duclos, Esteban and Ray (2004) is very useful for an economic analysis of classes. In this case, the number of groups is determined endogenously on the basis on the estimation of a non-parametric Kernel density function. This new measure is a natural extension of P_{α}^{ER} in a continuous support and based on the same identification-alienation model.

$f(x, h)$ is the non-parametric kernel estimate of income x , where n is the number

of observation and h is the bandwidth of the window²:

$$f(x, h) = \frac{1}{nh} \sum_{i=1}^n \left(\frac{1}{\sqrt{2\pi}} \right) \exp\left(-\frac{(x - x_i)^2}{h^2}\right) \quad (1.8)$$

The sense of identification is now expressed through the density $f(x)$ at x , while the alienation is expressed by the distance between individuals with different income x and y . The effective antagonism of x towards y is equivalently $T(i, a)$, increasing function of the alienation. Taking polarization as proportional to the sum of all the effective antagonisms we have:

$$P(F) = \iint T(f(x), |x - y|) f(x) f(y) dx dy \quad (1.9)$$

Let f be a density for which we want to investigate the degree of polarization. $P(F)$ is proportional to the “pure” polarization measure $P_\alpha(f)$ for which individuals identify themselves only with those with similar income levels:

$$P_\alpha(f) = \iint f(x)^{1+\alpha} f(y) |x - y| dx dy \quad (1.10)$$

$P_\alpha(f)$ is scale free if we normalise all incomes by their mean. The range of α is now between 0 and 1. The Axioms are now based on distributions composed of basic densities (see Duclos et al., 2004).

The alienation felt by an individual with income y is measured by $a(y)$:

$$a(y) = \mu + \frac{2(i-1) - n}{n} y_i - \frac{2}{n} \sum_{j=1}^{i-1} y_j \quad (1.11)$$

² F represents the case of a Gaussian Kernel function.

and i_α is the corresponding α identification. This is represented by the kernel density $f(x)$, estimated with 1.8.

$$i_\alpha = f(y)^\alpha \quad (1.12)$$

The product between i_α and $a(y)$ generates the polarization curve which can be represented graphically

$$p_\alpha(f) = f(y)^\alpha a(y) \quad (1.13)$$

Integrating the curve with respect to the income range, the corresponding index of polarization can be expressed with the following expression:

$$P_\alpha^{DER} = \int_y f(y)^\alpha a(y) dF(y) \quad (1.14)$$

polarization depends on the weight that is assigned to the identification effect. The degree of sensitivity of polarization, is now measured by the degree of “spikiness” of a distribution. Furthermore, alienation and identification are not independent. If a distribution moves from a unimodal to a multimodal shape, the degree of identification increases naturally. Yet, polarization is not only affected by a change in identification. The presence of several modes in the distribution also affects the degree of initial alienation. Hence, alienation increases in response to the increasing level of variability.

Finally, in order to identify the contribution of each component, the polarization index can be decomposed as

$$P_\alpha(f) = \overline{at}_\alpha [1 + \rho] \quad (1.15)$$

where \bar{a} is the average alienation effect

$$\bar{a} = \int a(y) dF(y) = \iint |y - x| dF(x) dF(y) dx \quad (1.16)$$

and \bar{l}_α is the average identification effect

$$\bar{l}_\alpha = \int f(y)^\alpha dF(y) = \int f(y)^{1+\alpha} d(y) \quad (1.17)$$

and

$$\rho = \frac{cov_{i_\alpha, \alpha}}{\bar{l}_\alpha \bar{a}} \quad (1.18)$$

The importance of the research of Duclos, Esteban and Ray (2004) is given also by the fact that they have attempted to study what might be broadly referred to as “social polarization”. This term is used when the factors that determine individuals’ identity do not depend solely on their income but are also driven by culture, social context, biological factors and so on (D’Ambrosio and Permanyer, 2014). Different specifications of the polarization indices have been developed for taking into account the role of a wide range of individual characteristics. Other empirical or theoretical works that have not only considered the measurement of income polarization are, for example, D’Ambrosio (2001), Zhang and Kanbur (2001), and Garcia-Montalvo and Reynal-Querol (2005).

The decomposition of the Duclos, Esteban and Ray index

Furthermore the Duclos, Esteban and Ray (2004) (DER) index can be decomposed by population subgroups. The procedure that has to be applied is similar to the one developed for Gini index decomposition as pioneered by Bhattacharaya and Mahalanobis (1967).

In this way, we are able to address the following questions (Araar, 2008):

1. how do population groups contribute to total polarization?
2. How can population groups explain polarization?
3. What are the main masses -modals of the distribution- that attract each population group?

The first question can be addressed assuming that all groups have identical distributions of income but have a different population size so that the relative contribution of each group simply depends on its population share. Considering the second question, in case of non income overlap, groups represent the different masses of the distribution. Groups' contribution to explain polarization can be isolated considering their average income and population shares. For the third question, the answer can be provided comparing the role of different individual characteristics to attract people at the top or at the bottom of the distribution.

Writing the Duclos, Estaban and Ray (2004) polarization index as follows:

$$P = \int \int f(x)^{1+\alpha} f(y) |x - y| dy dx \quad (1.19)$$

the alienation component $a(x) = \int f(y) |x - y| dy$ simply expresses the expected absolute distance between income x and the other incomes. Then it can be decomposed into two more comprehensible components since:

$$|y - x| = (y - x)_+ + (x - y)_+, \quad (1.20)$$

where $(\varepsilon)_+ = \varepsilon$ if $\varepsilon > 0$ and zero otherwise.

Araar (2008), following Runciman (1966) who defines relative deprivation as the difference between the desired situation and the actual situation of the individual,

considers the relative deprivation of household with income x compared to that with income y as follows:

$$\tau(x, y) = (y - x)_+ = \begin{cases} x - x & \text{if } x = y \\ 0 & \text{otherwise} \end{cases} \quad (1.21)$$

Thus, the expected deprivation of household with income x is equal to:

$$\delta(x) = \int \tau(x, y) f(y) dy \quad (1.22)$$

and, similarly, the expected surplus is equal to:

$$\sigma(x) = \int \tau(x, y) f(y) dy \quad (1.23)$$

Hence, local alienation can be decomposed into expected deprivation plus expected surplus components:

$$a(x) = \delta(x) + \sigma(x) \quad (1.24)$$

By replacing 1.24 in equation 1.19, it is possible to obtain:

$$P = \int f(x)^{1+\alpha} \alpha(x) dx \quad (1.25)$$

$$= \int f(x)^{1+\alpha} [\delta(x) + \sigma(x)] dx \quad (1.26)$$

$$= D + S \quad (1.27)$$

where $D = \int f(x)^{1+\alpha} [\delta(x)] dx$ is the deprivation component and the complement

part S is the surplus. As pointed out by Araar (2008) these two components are equal when the distribution is symmetric or the parameter α is equal to 0. In general, the distribution of income is asymmetric and we can expect that $D > S$.

Then, considering the density function for group g by f_g and based on equation 1.26, the contribution of individual(s) with income x to the DER index is:

$$c(x) = \frac{a(x)f(x)^{1+\alpha}}{\mu^{1-\alpha}} \quad (1.28)$$

The alienation component $a(x)$ for the individual with income x belonging to group g can be decomposed as:

$$a(x) = \varphi_g a_g(x) + \tilde{a}_g(x) \quad (1.29)$$

Where $a_g(x)$ is the alienation for the individual within its group g and $\tilde{a}_g(x)$ the alienation component at the population level ignoring within-group alienation. Denoting the local proportion of individuals of group g with $\pi_g(x)$, $c_g(x)$ is the local contribution of this group to the DER polarization index:

$$c_g(x) = \pi_g(x) f(x)^\alpha \frac{f(x)a(x)}{\mu^{1-\alpha}} \quad (1.30a)$$

$$\frac{\mu_g^{1-\alpha}}{\mu^{1-\alpha}} \left[\frac{\pi_g(x) \varphi_g a_g(x) f(x)^{1+\alpha}}{\mu_g^{1-\alpha}} \right] + \frac{\pi_g(x) \tilde{a}_g(x) f(x)^{1+\alpha}}{\mu^{1-\alpha}} \quad (1.30b)$$

$$\varphi_g^\alpha \psi_g^{1-\alpha} \left[\frac{\pi_g(x) \phi_g a_g(x) f(x)^{1+\alpha}}{\mu_g^{1-\alpha}} \right] + \frac{\pi_g(x) \tilde{a}_g(x) f(x)^{1+\alpha}}{\mu^{1-\alpha}} \quad (1.30c)$$

Consequently, writing DER index as follow:

$$P = \sum_g \int c_g(x) dx \quad (1.31)$$

It can be decomposed as:

$$P = \underbrace{\sum_g \varphi_g^{1+\alpha} \psi_g^{1-\alpha} R_g P_g}_{\text{Within}} + \underbrace{\tilde{P}}_{\text{Between}} \quad (1.32)$$

where

$$R_g = \frac{\int a_g(y) \pi_g(y) f(y)^{1+\alpha} dy}{\varphi_g \int a_g(x) f_g(x)^{1+\alpha} dx} \quad (1.33)$$

with φ_g and ψ_g are respectively the population and income shares of group g , $\pi_g(x)$ denotes the local proportion of individual belonging to group g and having income y and \tilde{P} is the DER polarization index when the within-group polarization is ignored. R_g depends on the correlation between the density function of the group and that of the population and its equal to 1 if groups' incomes do not overlap.

The indicator $(1 - W/P)$ shows how much groups are locally polarised, while the indicator B/W can be used to show how much the considered groups polarise the distribution (Zhang and Kanbur, 2001; Araar, 2008).

Finally, to identify the main masses that attract each group we need to decompose the local alienation within each group into the two different components previously defined: the expected deprivation and expected surplus components.

Starting from equation 1.26 and 1.31, it is possible to write:

$$P = \sum_g \frac{1}{\mu^{1-\alpha}} \int ([\delta(x) + \sigma(x)] f(x)^\alpha) \pi_g(x) f(x) d(x) dx \quad (1.34)$$

$$= \sum_g D_g + S_g \quad (1.35)$$

Given the usual asymmetric distribution of incomes, expectedly $D > S$ (Araar,

2008): consequently, for each population subgroup g if g is composed of a significant part of low income individuals, the ratio $D_g/S_g > 0$ will be relatively higher than that of other groups.

Similarly, the DER polarization index can be decomposed by income sources to identify how each source contributes to the total polarization.

1.3.3 The relative distribution approach

A complementary and straightforward approach to investigate the “shrinking middle class issue” has been proposed by Jenkins (1995). He suggested an estimation method based on a Kernel density approach, looking directly at the changes in the relative concentration of people at each income level over time. Jenkins observed that changes in aggregate density can be related to change in subgroup density or changes in subgroup relative sizes. For this reason, he considered different subgroups to investigate more in depth the changing shape of income distribution, using the non-parametric density estimates.

Handcock and Morris (1998,1999) further developed this theoretical framework that has later been applied by Massari, Pittau and Zelli (2009) in their analysis of the evolution of the middle class in Italy.

The implementation of this non parametric tool which compares two groups (or time points) with respect to a continuous outcome variable, the “relative distribution”, enables these latter authors to distinguish shifts in pattern across an income distribution due to differences in location from shifts due to differences in shape, obtaining some interesting findings on the evolution of the Italian middle-income class. Borraz, Gonzáles Pampillón and Rossi (2013) and Alderson and Doran (2013) use the same methodology to analyse the evolution of the middle class in Uruguay and in

nine countries³ for which suitable data are available in the LIS database, respectively.

The relative distribution method assumes two populations, the “reference” and the “comparison” population, permitting to return the fractions of the “comparison” population that fall in each quintile of the “reference” population. In this way is possible to test hypotheses about distributional differences and, using decomposition techniques, to isolate location, shape and compositional effects. This procedure enables researchers to distinguish the impact of changes in population mix (a demographic process) from changes in attribute allocation (a social or economic process). Furthermore, this method combines the graphical tools of exploratory data analysis with statistical summaries, decomposition, and inference (Handcock and Aldrich, 2002).

Let Y_0 be a continuous random variable for the reference population (e.g. household income in 2000), F_0 its cumulative distribution function (CDF) and f_0 its probability density function (PDF). The comparison population (e.g. household income in 2012) generates the continuous random variable Y with F and f its CDF and PDF, respectively. The objective is to study the differences between the distributions of Y and Y_0 using Y_0 as the reference. Considering the grade transformation of Y to Y_0 (Cwik and Mielniczuk, 1989), we have $R = F_0(y)$ and its cumulative distribution function is $G(r) = F(F_0^{-1}(r))$ with $0 \leq r \leq 1$.

The corresponding density is

$$g_r = \frac{f(F_0^{-1}(r))}{f_0(F_0^{-1}(r))} = \frac{f(y_r)}{f_0(y_r)} \quad 0 \leq r \leq 1, y_r \geq 0 \quad (1.36)$$

Where f and f_0 are the densities, while r represents the proportion of values. On the one hand, $G(r)$ is the proportion of the target population which is below

³United States, United Kingdom, Czech Republic, Poland, Russia, Slovak Republic, Taiwan, Sweden and Germany.

the level of a proportion r of the reference population. On the other hand, $g(r)$ represents the ratio of the frequency of the target population to the frequency of the reference population at the r^{th} quantile of the reference population level $[F_0^{-1}(r)]$.

If the two distributions are identical then the relative distribution is uniform on $[0; 1]$. A value of $g(r)$ higher (lower) than 1 means a higher (lower) share of households in the comparison population respect to the reference population, at the r^{th} quantile of the latter distribution. Estimating, as in Massari, Pittau and Zelli (2009), the density functions with a non-parametric Kernel method is possible to obtain relative density functions for different realisations of R . Then a local-polynomial model can be fitted for each estimated point to have an accurate description of the relative density. In this way it is possible to decompose the relative distribution into location effect, in general associated with changes in the mean of the income distribution and shape effect, which captures changes in the covariate-outcome relationships.

Let $Y_{0L} = Y_0 + \rho$ be an *additive* location-adjusted population with the shape as the reference distribution and the median as the comparison distribution, where ρ is the difference between the medians of Y and Y_0 . Thus, the CDF of F_{0L} is defined as $F_{0L}(y_r) = F_0(y + \rho)$ and its derivative PDF is f_{0L} .

Formally,

$$\underbrace{\frac{f(y_r)}{f_0(y_r)}}_{Overall\ effect} = \underbrace{\frac{f_{0L}(y_r)}{f_0(y_r)}}_{Location\ effect} \times \underbrace{\frac{f(y_r)}{f_{0L}(y_r)}}_{Shape\ effect} \quad (1.37)$$

This approach developed also a median relative polarization index that considers changes in the shape of the distribution and measures the direction and the amount of these changes to detect the degree of polarization (Handcock and Morris, 1998). This index measures the average of the absolute value from the median of the shape effect function $g_s = \frac{f(y_r)}{f_{0L}(y_r)}$, re-scaled in order to vary between -1 and 1.

An increasing (decreasing) polarization is detected when the measure is positive (negative), while no changes are observable when the index is equal to zero.

The median relative polarization index of Y with respect to Y_0 is formally defined as it follows:

$$MRP(F, F_0) = 4 \int_0^1 \left| r - \frac{1}{2} \right| g_s(r) dr - 1 \quad (1.38)$$

Which can be estimated as:

$$\widehat{MRP}(F, F_0) = \frac{4}{m} \sum_{j=1}^m \left| \widehat{R}_j - \frac{1}{2} \right| - 1 \quad (1.39)$$

Finally, the MRP index can be decomposed into a lower and upper polarization index which investigates the change of the overall polarization due to income above and below the median of the relative distribution.

They are defined by:

$$LRP(F, F_0) = 8 \int_0^{1/2} \left| r - \frac{1}{2} \right| g_s(r) dr - 1 \quad (1.40)$$

$$URP(F, F_0) = 8 \int_{1/2}^1 \left| r - \frac{1}{2} \right| g_s(r) dr - 1 \quad (1.41)$$

And can be estimated in a similar way.

1.4 Conclusion

The concept of “class” requires the examination of multiple dimensions. Nevertheless, the majority of economic studies only consider relative definitions and uses the

term “class” addressing a stratum of the income distribution rather than an analysis of the notion “class”. In particular, this is very common in the empirical research aimed at identifying and measuring the middle class and its evolution over time as it often ignores the important contributions of sociologists and classical economists. Furthermore, conventionally adopted approaches in economics lead to different picture of change over the years of the evolution of middle as results depend on the definition considered.

The first aim of this Chapter was to provide a review of the most widely used income-based measures of the middle class in economics, considering its limits and the necessary integrations (Atkinson and Brandolini, 2013).

The growing recognition of the role of the middle class as a stabilising force and the increasing attention to what is happening to the middle groups in the public debate raise the necessity to identify and compare middle class without any arbitrariness. For these reasons, Section 3 of this Chapter aimed to propose alternative and complementary methodologies for the analysis of the middle class which try to avoid some of the definitional problems and are very useful to provide some stylised facts on the evolution of this group.

Despite the need for the development of an axiomatic approach to defining a complete index able to measure the middle class including additional dimensions as the role of property or the occupational structure, the integrated framework proposed in this Chapter that has been drawn from polarization studies - even if considering a single quantitative characteristic, such as income, as to distinguish who belongs to the middle class - displays many strengths.

First, comparisons of the size of the middle class over time may be done producing uniform conclusions that are not dependent on the choice of the thresholds that divide the middle class from other groups. Second, the presented studies are

able to combine theoretically income-based aspects with the roles played by different features. This is especially the case of the identity-alienation framework which integrates inputs from the classical and sociological analysis of social classes. Finally, additional information beyond the one provided by the traditional measures of the middle class can be deduced, obtaining a more comprehensive analysis of polarization and the evolution of the middle class.

Chapter 2

An application to Italy: the evolution of the middle class from the nineties to the years of the crisis

2.1 Introduction

In this part of the thesis an empirical application to the case of Italy on the evolution of the middle income groups will be provided using the methods from literature on polarization that have been reviewed in Chapter 1.

Since we are talking about the middle class, it is better to specify some important points and briefly overview the studies on this topic related to the specific case of Italy.

An important contribution to the analysis of the middle class in Italy comes from Sylos Labini (1974, 1986) who defines the complex universe of the “middle classes” on the basis of the relation to the process of value formation and in terms of the origin of personal income. In his classification of classes, the middle class is identified with the *petty bourgeoisie* who can be further broken down into three categories: *the relative independent petty bourgeoisie* (farmers and sharecroppers, artisans, shopkeepers and small business people and professionals), *the salaried petty bourgeoisie* (white collar workers and teachers, technicians etc.) and *special categories* (members of the clergy

and the military).

Considering data of a wide time-span, from 1881 to 1971, Sylos Labini's analysis (1974) shows an enormous expansion of the middle class, in particular, of the component not directly involved in the production process.

The author interprets this change as due to three main phenomena: the bureaucratisation of many private enterprises that have been absorbed by the Public Administration; the creation and expansion of several offices responsible for the distribution of public funds; the inclusion in the central bureaucracy of a huge number of graduates.

Other authors (Trigilia, 1976; Paci, 1979) follow Sylos Labini in the difficult task of representing the Italian class structure paying attention to the evolution of the middle class.

With the end of the two major Italian parties (PC and the DC) in 1989-1993, as reported by Sassoon (1997), class analysis lost its importance in the public and scientific debates. In the following years, empirical studies in economics began to analyse the distribution of personal or family income and/or consumption, focusing mainly on poverty dynamics (e.g. Brandolini, 2000; Addabbo, 2000).

The issue on the middle class regained a prominent position in political and academic debates around 2004 when an increasing malaise was documented to hit the middle class. As reported by Bagnasco (2005) in this period the main focus of the public discussion was whether or not the middle class was indeed becoming poorer. An important boost to the question of the middle class was given by a series of reports published in the Italian newspaper *Corriere della Sera* (Di Vico and Fittipaldi, 2004; Boeri and Brandolini, 2004).

According to Bagnasco (2004; 2010), this moment coincided with the end of the old social contracts. As it was reported in the introduction to a special issue

“Middle class and the deep crisis” of the review Il Mulino, 2004 (cited by Boeri and Brandolini, 2004):

“The social contract of the post-war democracies, aimed at improving standards of living and consumption prospects in search of a more equitable distribution of the fruits of economic development, is falling apart. The brunt has been borne above all by citizens who are neither too poor, nor too rich, but are increasingly vulnerable – that part of the population which has experienced in the second half of the last century a growth in its consumption and possibility to accumulate wealth” (2004, p. 277).

In this perspective, therefore, it would be possible to explain the revival of interest in academia towards the analysis of the whole distribution and the middle class, which has given rise to a new stream of literature that examines inequality and considers interventions in favor of redistribution.

Thus, the subsequent empirical studies on the Italian economy do not investigate classes on the basis of the individual relation to the production process as in the Seventies but instead consider income classes. In line with the most common approaches in economics that were reviewed in Chapter 1, middle class is defined, with some exceptions (Massari, Pittau and Zelli, 2009), as the middle income stratum by middle income deciles or a proportion of the median income (see for example Boeri and Brandolini, 2004; Atella and Rossi, 2004; Pisano and Tedeschi, 2007).

Nevertheless, different definitions lead to different results and the supposed worsening in the position of the middle class needs further investigation.

Furthermore, the effects of the economic recession of recent years on the middle stratum and the increasing social distance in the Italian society (Carbone and Ceravolo, 2012) have yet to be explored.

The widespread phenomenon of insecurity and impoverishment reinforces the necessity to apply an approach based on income distribution since occupational categories can reveal only some of the characteristics that might define a status group (Bagnasco, 2005).

The aim of this Chapter is, therefore, to apply to the case of Italy the methods deriving from polarization literature to measure the evolution of the middle class in an unambiguous way. Even though it is reasonable to wonder whether a pure income characterisation of social classes is analytically satisfactory, it is worth noting that the applied approach allows the inclusion of multiple dimensions in the analysis, combining income-based aspects with the roles played by different features.

2.2 Data and methodological choices

Our data are drawn from the Survey on Household Income and Wealth (SHIW) of the Bank of Italy which provides data on the incomes and savings of Italian households. We rely on data from the Historical Archive (HA) of the survey (version 8.0, released in January 2014), covering the years for which the data are available from 1995 to 2012. The income variable used in the analysis is net disposable income which is the sum of all cash incomes earned by the household and comprises compensation of employees, pension and other transfer, income from self-employment and entrepreneurial income and property income including income from financial assets, net of income taxes, social security contribution and imputed rents.

Similarly to many studies which examine income distribution, the economic unit of aggregation is the household. This is defined as a group of persons living together who, independently of their kinship, share their income wholly or in part (Boeri and Brandolini, 2004). This choice reflects the conviction that the standard of living of an individual is closely linked to the household of belonging, while the traditional

concept of family is not suitable to represent the current reality. Nevertheless, as in Horrigan and Haugen (1988) who found that the middle class is better identifiable with families rather than households, different positions regarding the unit of observation from the sample can be adopted. In our case, intra-household distribution is assumed as egalitarian and the unit considered is the person (rather than the household). This means that each household's income is counted as many times as the number of household's members. Distribution is thus measured between individuals, attributing to each person the equivalent income of the household to which he or she belongs. Henceforth, household income and equivalent household income are used synonymously. Incomes are adjusted for household size using the Italian official equivalence scale¹ and real incomes are examined at 2012 prices by dividing nominal values by the deflator of the final consumption expenditure of households available in national accounts (HED). Following Atkinson and Brandolini (2013), to minimise the impact of outliers all records with zero income are dropped, and observations are bottom-coded at 1 percent of the mean of equivalent disposable income and top-coded at 10 times the median of unadjusted disposable income.

2.3 Evidences from traditional definitions of the middle class

Table 2.1 provides summary measures for household incomes from 1995 to 2012 on the basis of different intervals drawn from economics literature and previously reviewed. At first glance, the main observable evidence is that mean and median incomes decreased from 2008, inverting the previous tendency. At the same time, people below 50%, 60% and 75% of the median income rose and, on the contrary, individuals in the upper part of the distribution decreased from 2010 to 2012.

¹This scale assigns 1 to a 2-member household, 0.599, 1.335, 1.632, 1.905, 2.150 and 2.401 to household of 1, 3, 4, 5, 6 and 7 or more members, respectively.

2.3. Evidences from traditional definitions of the middle class

Table 2.1: Summary measures (family disposable income per equivalent adult - price 2012)

	1995	1998	2000	2002	2004	2006	2008	2010	2012
N. individuals	14641	12642	14262	14002	13896	13408	13679	13700	13602
Mean	28711	30540	30752	30840	32115	32769	32617	32410	29554
Median	24992	26096	26961	26959	27867	28745	28638	28561	25814
% pop. with incomes									
Below 50%	13.6	11.82	10.74	9.92	9.46	8.19	8.92	9.75	12.08
Below 60%	20.57	18.01	17.56	15.46	15.29	13.05	14.3	15.27	19.47
Below 75%	32.42	29.08	28.24	27.2	25.57	23.07	24.64	25.21	30.4
50% to 150%	56.81	66.81	66.74	67.03	66.04	64.4	64.45	63.4	67.16
60% to 225%	75.02	77.19	77.76	79.82	79.45	81.47	79.53	79.06	76.01
75% to 125%	36.41	36.83	36.14	37.53	36.09	36.12	34.74	34.36	36.82
75% to 150%	37.99	49.55	49.24	49.75	49.93	49.52	48.73	47.94	48.84
75% to 200%	59.59	61.52	62.57	62.8	63.72	65.06	64.15	63.4	60.78
Above 125%	31.17	34.09	35.62	35.27	38.34	40.81	40.62	40.43	32.78
Above 150%	29.59	21.37	22.52	23.05	24.5	27.41	26.63	26.85	20.76
Above 200%	7.99	9.4	9.19	10	10.71	11.87	11.21	11.39	8.82
Above 225%	4.41	4.8	4.68	4.72	5.26	5.48	6.17	5.67	4.52
Income shares (%)									
50% to 150%	48.45	54.64	54.36	54.43	52.34	50.25	50.41	49.75	56.46
60% to 225%	78.39	77.7	78.76	80.37	78.36	80.18	77.8	78.49	79
75% to 125%	32.2	30.83	30.12	31.29	28.89	28.34	27.45	27.22	31.99
75% to 150%	36.71	45.42	45.14	45.23	44.16	42.81	42.53	41.96	46.44
75% to 200%	64.1	62.74	64.26	63.87	63.09	63.75	63.45	63.05	64.23
1th quintile	7.39	7.22	7.6	7.94	7.79	8.06	7.84	7.48	7.36
2th quintile	12.88	12.89	12.97	13.2	13.05	13.31	13.14	12.99	12.98
3th quintile	17.43	17.2	17.48	17.52	17.36	17.58	17.54	17.61	17.6
4th quintile	22.94	22.41	22.7	22.68	22.53	22.93	22.79	22.95	23.05
5th quintile	39.36	40.28	39.25	38.66	39.28	38.12	38.69	38.96	39
9th decile	14.8	14.49	14.53	14.7	14.49	14.69	14.56	14.67	14.75
10th decile	24.56	25.78	24.68	23.84	24.72	23.36	24.06	24.25	24.22

Notes: own calculation on weighted household income data from SHIW.

Income data are size-adjusted and expressed in 2012 prices.

But what about the evolution of the “middle class”? Over the period considered different evidences on the size and on the income share of the middle income groups can be presented according to the different definitions provided. In general, a substantial stability of the quote of the income share in the middle quintiles is evident, while results are controversial considering definitions based on medians. In particular, most of the problems arise from the comparison of the last four waves of the survey where it is very difficult to establish how the economic recession started in 2007-2008 impacted the middle income groups. For these reasons further investigation is needed. In the next Sections some methodologies reviewed in the previous Chapter will be applied in order to obtain unambiguous results.

2.4 Polarization and the middle class in Italy

The first step forward to assess the evolution of the middle income groups in the years from 1995 to 2012 is to calculate different polarization indices whose values are reported in table 2.2². As described in Chapter 1, the index reported in the first row by Foster and Wolfson (FW) is focused on the idea that only two income groups exist whereas the Duclos, Esteban and Ray (DER) index and the Esteban, Gradín, and Ray (EGR) index are consistent with the *identity-alienation* framework proposed by Esteban and Ray (2007). These two latter indices are based on the estimation of the density function of the income distribution.

The DER index is broken down into its components *alienation* and *identification*, and the correlation between the two is reported.

Different values of α reported for the EGR index mean different levels of identification. A greater value of α means that more emphasis is placed on the identification.

²Computed using the STATA module DASP (Distribution Analysis Stata Package). In the interests of space, we are not reporting the standard errors, lower and upper bounds.

Table 2.2: Polarization indices

	1995	1998	2000	2002	2004	2006	2008	2010	2012
FW	0.13	0.1279	0.1246	0.1225	0.1241	0.1232	0.1238	0.1275	0.1299
DER $\alpha = 0, 5$	0.205	0.2078	0.2044	0.2004	0.2038	0.1986	0.2016	0.2032	0.2036
<i>Alien.</i>	0.3186	0.3279	0.3155	0.3052	0.3133	0.2997	0.3073	0.3141	0.3157
<i>Identific.</i>	0.752	0.7563	0.7566	0.768	0.7772	0.7753	0.7747	0.757	0.7435
<i>Corr.</i>	-0.144	-0.162	-0.144	-0.145	-0.163	-0.145	-0.153	-0.145	-0.133
EGR $\alpha = 1$	0.0898	0.0921	0.0894	0.0863	0.0883	0.0846	0.0869	0.0889	0.0895
EGR $\alpha = 1, 3$	0.0653	0.0673	0.0652	0.0627	0.0645	0.0614	0.0633	0.0648	0.0653
EGR $\alpha = 1, 6$	0.0477	0.0495	0.0479	0.0458	0.0474	0.0449	0.0464	0.0475	0.0475

Notes: own calculation on weighted household income data from SHIW.

With the exception of 1998, when compared to the previous wave the index proposed by Foster and Wolfson shows a modest decline while the others increase, all the indicators display the same trend across the whole period being considered. What emerges is that, on the one hand, polarization indices show a gradual decrease between 1998 and 2006. On the other hand, the period from 2006 to 2012 is characterised by a tendency towards an increasing polarization. Consequently, to quantify changes that occurred to the middle class it is particularly interesting to compare the income distributions before and after the beginning of the recession of 2008.

2.4.1 A graphical analysis

A straightforward investigation can be done applying the graphical analysis proposed by Foster and Wolfson (1992) the results of which are reported in figures 2·1,2·2,2·3.

Figure 2·1 represents the constructed M-curves for 2006 and 2012 which are able to provide some evidence of the middle class not being restricted to any particular definition.

The M-curve is aimed at measuring the concentration of mass around the median of the income distribution: looking at different population ranges around the middle

Figure 2.1: Evolution of the middle class. M curves for 2006 and 2012

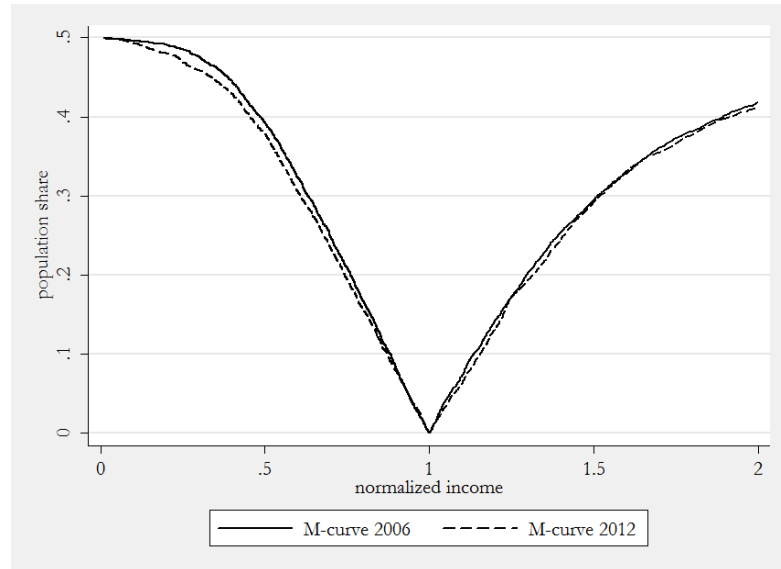


Figure 2.2: Evolution of polarization. S curves for 2006 and 2012

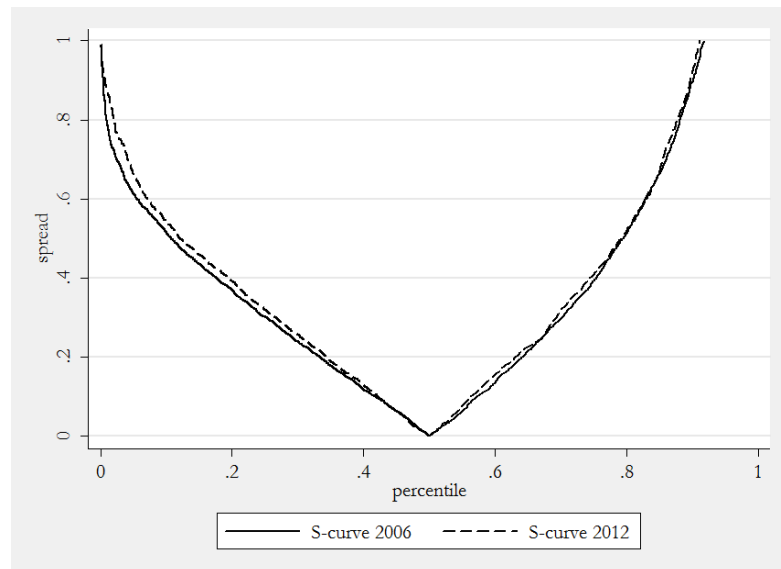
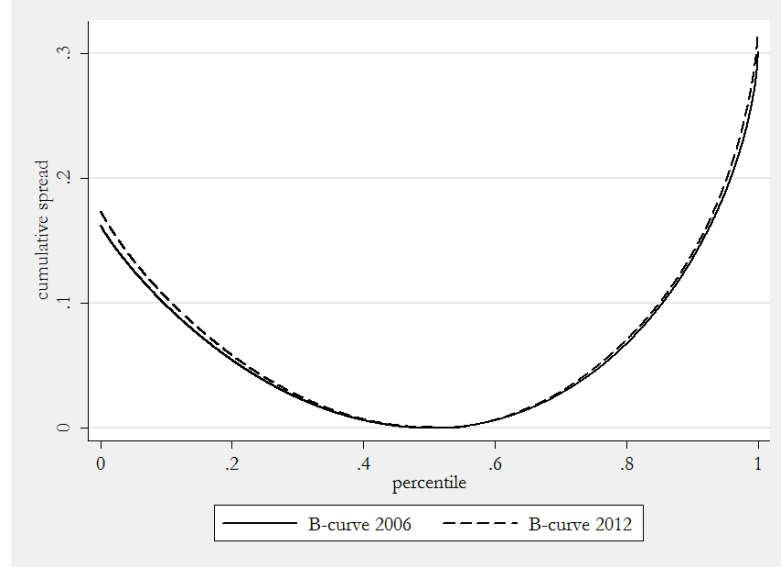


Figure 2-3: Evolution of polarization. B curves for 2006 and 2012

we can observe that the M curve of the income distribution of 2006 is always above the M curve of the income distribution of 2012, in particular considering the part of the distributions below the median. This means that the income distribution function in 2006 has a larger middle class than the income distribution function in 2012 as the former distribution attracts more mass around the median than the latter.

Figure 2-2 represents the first degree polarization curves which plot the distance between the median and the median normalised income of the person at the q^{th} percentiles. The normalised distribution function of 2012 has a greater spread near its median than the one of 2006 reflecting an increased bipolarity across the major part of the distribution. Similarly, the second degree polarization curves in figure 2-3, according to the 4th Proposition in Foster and Wolfson (1992), reveals that for any middle class population Q , the average distance of its members' incomes from the median (in terms of medians) is higher in 2012 than in 2006.

With the help of these curves, we have graphically depicted many aspects of

the distribution related to the evolution of the middle income groups, identifying a squeezing middle class and a wider distance between poles in 2012 than in 2006.

2.4.2 Distributional differences between 2006 and 2012

Furthermore, to evaluate what kind of changes have occurred in the relative concentration of people at each income level over the last four waves of the survey, the relative distribution approach³ needs to be implemented. This kind of analysis has already been applied to Italy using the same data by Massari, Pittau and Zelli (2009) who investigated differences between income distributions of 2000 and 2004. In our case, the relative distribution analysis compares 2006 with 2012.

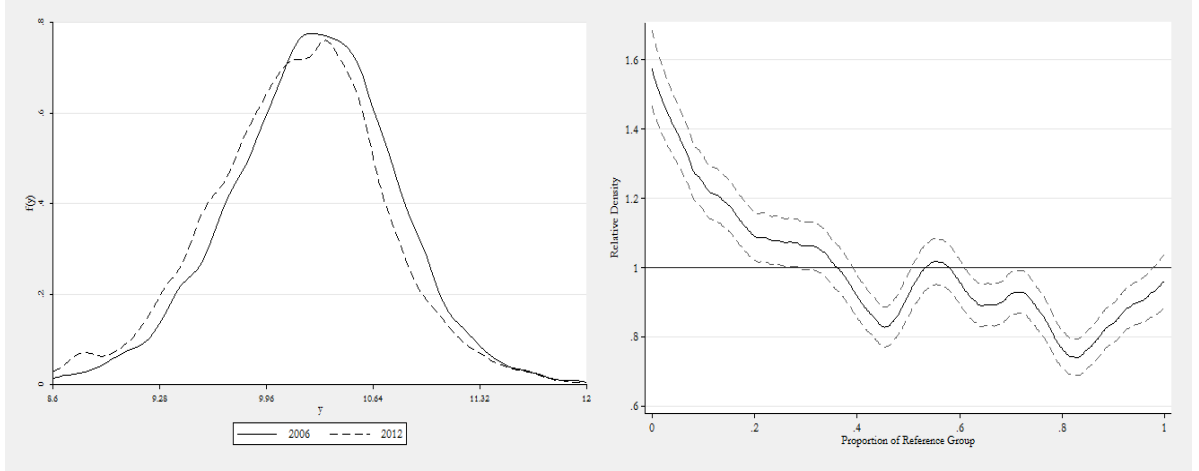
Figure 2-4 reports the kernel density estimates for the years selected. A clear shift of the distribution leftward given to the decreased of the median income in this period and a change of the shape in the middle part are observable. Two clear modes appear in 2012 while there is not any evidence of bimodality in 2006. As reported in Massari, Pittau and Zelli (2009) and already explained in Pittau and Zelli (2006) the emergence of the modes and the gap between them could be related with an increase in polarization, especially when variations of inequality are not detected.

The relative density function reported in the second panel of the figure 2-4⁴ directly compares the two densities. It represents the ratio of the income density in the comparison year to the income density in the reference year evaluated at each percentile of the income distribution. It can be interpreted as the fraction of individuals in the comparison population that fall in each reference income percentile. This means that when the fraction of the comparison population in a percentile is higher (lower) than the fraction in the reference year, the relative distribution will

³The author would like to thank Ben Jann for access to the pre-release version of *reldist*, a STATA program for relative distribution method.

⁴In figure 2.4 and figure 2.5 dotted lines represent 95% confidence intervals.

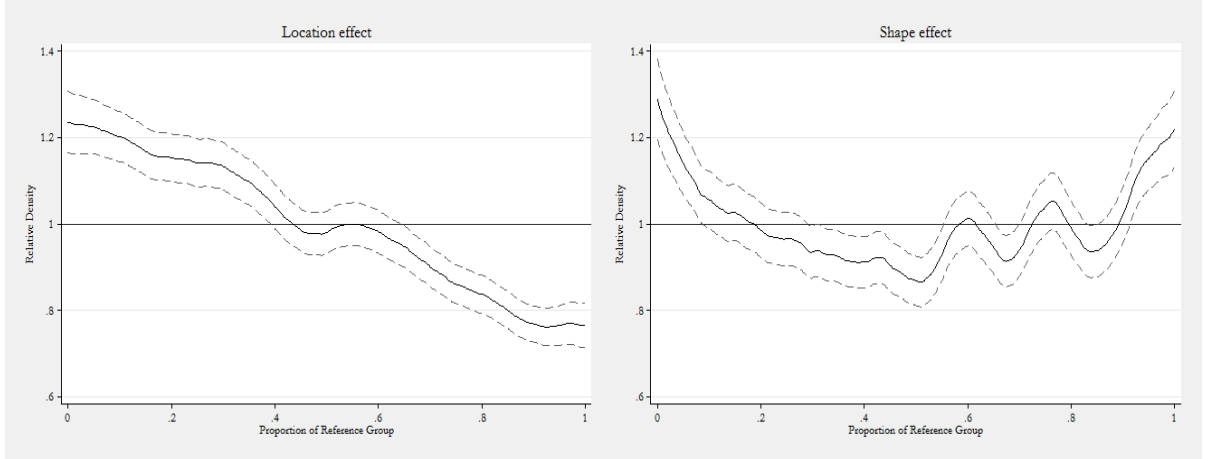
Figure 2-4: Comparison between 2006 and 2012 income distributions



be higher (lower) than 1. When the relative density has a value of 1.0, it indicates there has been no change at that point on the distribution over the period under consideration.

In this way it is possible to observe a dramatic growth of the number of people at the lower part of the income distribution, those below the 35th percentile rank in the reference year 2006.

More specifically, the relative distribution is more than 1 below the 35th percentile and less than 1 above that, with an exception between 52th and 57th percentile where the ratio is bigger than 1. This means that if we choose any percentile between the 1st and the 35th in the 2006 distribution, the fraction of households in 2012 that earn an amount of income corresponding to the chosen percentile is higher than the analogous fraction of households in 2006. The dynamic around the middle deciles points out a significant alteration of the shape given to the presence of the two modes, indicating a drop of the share of individuals especially at the 45th, 65th percentile. The negative peak of 0.75 is at around the 82th percentile, meaning that households in 2012 are

Figure 2-5: Location effect and shape effect

approximately 75% less likely to fall at the level of 2006 income corresponding to the 82th percentile than households in 2006.

Figure 2-5 reports the decomposition of the relative distribution into location and shape effects with their corresponding 95% confidence intervals.

The first panel represents the effect associated with changes in the median (or mean) of the income distribution. The location effect increases the share of households in bottom percentiles, decreasing those in higher percentiles. The effect imputable to the lower median is dropped when we consider the shape component displayed in the second panel. The main important evidence is that a shrinking middle class is observable, with a significant loss of recent households in deciles 2 through 7.

At the top of the distribution, however, it is noticeable to observe an opposite effect from the location shift: operating by itself, the shape effect would have significantly increased the number of individuals in the upper deciles.

Also in this part of analysis summary measures are important tools for the comparison of distributional change: the link between what we have observed in the

Table 2.3: Relative polarization indices (2006-2012)

Index	Value	Bootstrap Std. Err	CI (95%)	
MRP	0.034***	0.011	0.013	0.056
LRP	0.046***	0.017	0.012	0.079
URP	0.023	0.016	-0.009	0.055

Notes: own calculation on weighted household income data from SHIW

* stands for statistically different from zero at 10%, **at 5%, ***at 1%

and its referred to the null hypothesis that polarization does not change.

graphical analysis and the quantification of the degree of polarization is yielded by the median relative polarization indices (MRP) for the relative distribution.

The MRP is able to be divided into the contributions made by components above and below the median of the relative distribution as reported in table 2.3.

The 95% pointwise confidence intervals for the MRP index and the LRP and URP indices are indicated for the null hypothesis of no change with respect to the reference year (i.e. that the index equals 0).

The estimated polarization indices reveal a significant and positive polarization at both the median and lower parts of the distribution. The first values can be interpreted as a 3,4% of the population shift from the median of the distribution to upper or lower positions⁵. The lower indicator is larger, indicating a greater spread in the lower tail of the distribution than in the upper tail.

⁵See Massari, Pittau and Zelli (2009).

2.4.3 An integrated analysis by household head's characteristics

Given these results, it is very interesting to explore more in depth the dynamics of the middle income groups across time.

As pointed out by Jenkins (1995):

“The underlying causes of the changing shape of the income distribution can also be explored using the non-parametric density estimates, by exploiting the relationship that exists between the concentration of the population as a whole and the concentrations of each of the constituent subgroups. [...] Thus, changes in the aggregate density may arise via changes in subgroup densities or changes in subgroup relative sizes.” (Jenkins, 1995, p. 410)

In order to identify what kind of changes in the allocation of income between and within different subgroups can be related to the rise of polarization observed between 2006 and 2012, two different researches are carried out:

1. the first analysis visualises and analyses changes in distributions for different population subgroups formed on the basis of household head's characteristics;
2. the second analysis, using the decomposition of the DER index for 2012 as proposed by Araar (2008), identifies and quantifies the role of individuals' characteristics in attracting people at the top or at the bottom of the distribution.

In both cases, groups are identified according to the occupational status, education attainment, age and residential area of the head of the household. This is because employment status and level of education of household head are widely recognised as fundamental determinants of the income distribution and many studies on inequality consider their role to create and reproduce social disparities (Boeri

and Brandolini, 2004). Furthermore, Italy is characterised by one of the widest geographic dualisms of all OECD countries, with marked regional disparities between the Centre-North and the South (OECD, 2001). Finally, the distribution of income and wealth across age groups is changing in many countries worldwide (Vitali, Aassve and Furstenberg, 2014) and the consequences of the rapidly aging population in Italy on intergenerational differences need to be further explored.

Table 2.4 plots the set of the three relative polarization indices, based on the median-adjusted relative distribution for each population subgroup by household heads' characteristics, the MRP index, the LRP index and the URP index.

What emerges is that the MRP indices are significantly positive for almost all groups (with the exception of groups formed on the basis of residential area Centre, South and Islands and according to the low education and age more than 41 years old of the head of the household), indicating an increase in polarization within these groups. The highest significant values of MRP are observed when the head of household is less than 41 years old and, similarly to the evidence presented by Massari, Pittau and Zelli (2009) in their comparison between 2000 and 2004, for self-employment income distribution. High and significant values are also estimated for households in the North of Italy and for the group where the head of the household has a high level of education. This evidence is very useful in identifying where the most relevant structural changes have taken place. Nevertheless, another analysis needs to be implemented to identify differences between groups of society.

Table 2.4: Relative polarization indices by household head's characteristics (2006-2012)

	MRP	LRP	URP	N. 2012	N. 2006
Occupational status					
Employed	0.032129* (0.017138)	0.046389* (0.023704)	0.017869 (0.030916)	5886	6236
Self employed	0.090624*** (0.023874)	0.125653*** (0.03506)	0.055595 (0.041238)	1497	1665
Pensioner and not empl.	0.02944* (0.015541)	0.053552** (0.020986)	0.005328 (0.021817)	6218	5506
Education					
Low education	0.034003 (0.021449)	0.058514* (0.033318)	0.009493 (0.037406)	3099	3500
Middle education	0.041505** (0.018475)	0.05647** (0.026714)	0.026541 (0.028225)	4836	3879
High education	0.05504*** (0.015549)	0.07026** (0.027338)	0.03982* (0.022579)	5666	6028
Age					
Age <41	0.098368*** (0.024064)	0.043797 (0.036395)	0.152939*** (0.039058)	1800	2587
Age 41-55	0.019044 (0.015341)	0.079247*** (0.025051)	-0.04116 (0.028603)	4363	4399
Age >55	0.009217 (0.016044)	0.052814** (0.025095)	-0.03438 (0.030562)	7438	6421
Residential area					
North	0.05253*** (0.014228)	0.09099*** (0.023385)	0.01407 (0.025059)	5866	6413
Centre	0.004966 (0.02653)	0.051364 (0.03231)	-0.04143 (0.034162)	3066	2858
South and Islands	0.015326 (0.014769)	0.024433 (0.021308)	0.00622 (0.026108)	4669	4133

Notes: own calculation on weighted household income data from SHIW.

Standard errors are in parenthesis.

* stands for statistically different from zero at 10%, **at 5%, ***at 1% and it is referred to the null hypothesis that polarization doesn't change.

In table 2.5, we perform the breakdown of total polarization measured by the DER index (DER with the parameter of identification $\alpha = 0.5$) by population groups for year 2012.

On the one hand, ϕ_g , ψ_g , P_g indicates respectively population size, income share and the value of the DER polarization index. On the other hand, D is the deprivation component and S its complementary part the surplus⁶. Furthermore AC and RC indicate the absolute and the relative contribution of the characteristic considered to the within-group polarization component in absolute and relative terms.

The exclusive population groups are formed according to the occupational status, educational attainment, class of age and residential area.

The first thing to note is that even though groups are different by their population size (ϕ_g) or income share (ψ_g), their level of polarization (P_g) is approximately the same with the exception of self-employed where the DER polarization index is relatively higher. The highest homogeneity within groups (with the lower value of the within groups component) and the highest heterogeneity between groups (with the highest value of the between groups component) is observed when groups are formed on the basis of the educational level.

This evidence confirms the role of educational attainment to create and reproduce distinguishable social categories, as it has been extensively studied in numerous countries (Erikson, Goldthorpe, Jackson, Yaish and Cox, 2005). The ratio between the deficit and the surplus component highlights the spatial polarization of the Italian society: the south regions have the highest value of this ratio which means that its residents tend to be located in the lower part of the distribution. Comparing these findings with the ones obtained for 2006⁷, it is possible to consider that the

⁶See Chapter 1.

⁷Table for 2006 is reported in the Appendix.

Table 2.5: Decomposition of the DER polarization index by household head's characteristics (2012)

	ϕ_g	ψ_g	P_g	Intra-group polarization				
				D	S	D/S	AC	RC
Occupational status								
Employed	0.49	0.46	0.196	0.065	0.036	1.787	0.045	0.219
Self employed	0.115	0.151	0.238	0.012	0.011	1.053	0.003	0.017
Pensioner and not empl.	0.395	0.389	0.204	0.049	0.031	1.602	0.031	0.154
Within-group							0.079	0.389
Between group							0.124	0.611
Education								
Low education	0.213	0.167	0.188	0.033	0.012	2.69	0.007	0.034
Middle education	0.366	0.305	0.195	0.053	0.024	2.234	0.023	0.113
High education	0.421	0.527	0.204	0.04	0.042	0.951	0.04	0.198
Within-group							0.07	0.345
Between group							0.133	0.655
Age								
Age <41	0.183	0.148	0.205	0.27	0.011	2.346	0.006	0.028
Age 41-55	0.351	0.334	0.207	0.046	0.026	1.78	0.024	0.12
Age >55	0.466	0.519	0.206	0.053	0.041	1.299	0.047	0.229
Within-group							0.077	0.377
Between group							0.127	0.623
Residential area								
North	0.49	0.554	0.195	0.052	0.045	1.14	0.049	0.242
Centre	0.198	0.213	0.198	0.022	0.017	1.625	0.008	0.039
South and Islands	0.312	0.233	0.209	0.052	0.015	3.423	0.016	0.08
Within-group							0.073	0.36
Between group							0.13	0.64

Notes: own calculation on weighted household income data from SHIW.

most interesting changes are observable when groups are formed on the basis of age. Indeed, the income share of the oldest age group has increased from 43% to 52% despite an increase of just four percentage points in the population share of those who are more than 55 years old. In 2012, looking at the ratio D/S, it is possible to state that the group whose head of household is younger than 41 years is composed of, to a significant extent, relatively lower income individuals than in 2006, while the opposite is observable for low educated heads' families.

2.4.4 Middle class identification

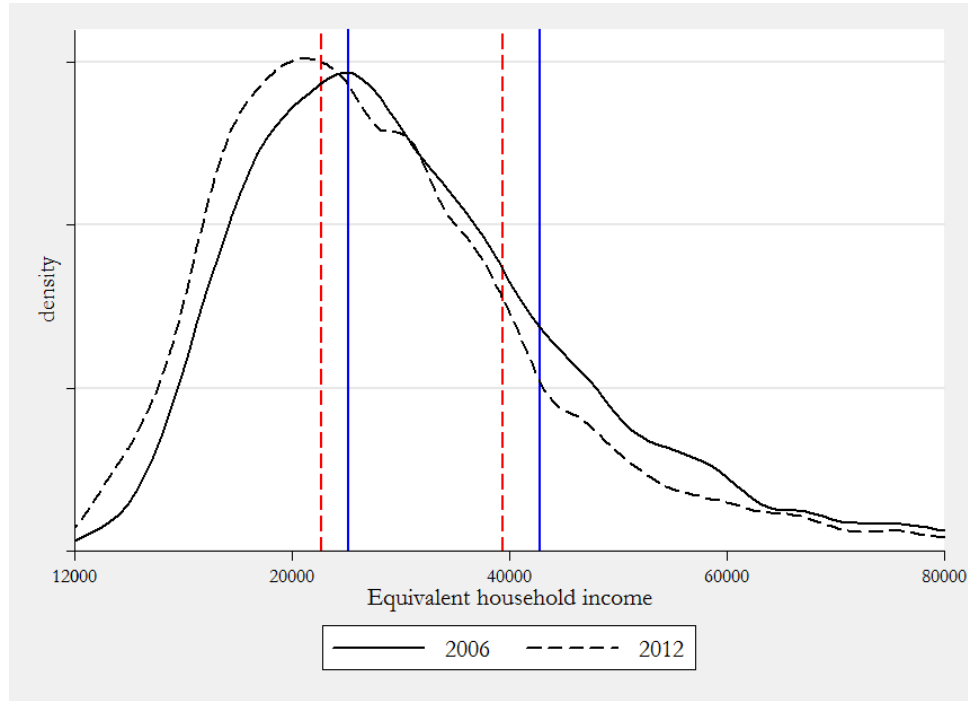
In the previous sections useful tools for a description and synthesis of the evolution of middle class have been adopted but the identification of individuals who can be considered middle class in each single year on the basis of the income distribution is still lacking. The approaches of Foster and Wolfson (1992) and Handcock and Morris (1998, 1999) applied to middle class analysis are able to provide relative measure that can tell us whether the middle class is (or not) greater in two time periods, but there is no information on who the households are that have income in a specific and comparable range that can be identified as the middle class.

In this part of the Chapter it is proposed to apply the process implemented by Esteban, Gradín, and Ray (2007) to identify lower, middle and upper class with the calculus of the optimal income boundaries to separate each group from the others⁸, as it has been suggested by Cruces, López Calva and Battiston (2011).

As reported by these latter authors, the main advantage of this exercise is that the values of income boundaries are determined endogenously by the shape of the income distribution and the resulting groups are derived from theoretically defined

⁸D'Ambrosio, Muliere and Secchi (2003) proposed a method for detecting income classes based on the change-point problem before the development of the first polarization index that does not require a pre-grouping of the incomes by Esteban, Gradín, and Ray (2007).

Figure 2-6: Polarization-based thresholds of the middle class for 2006 and 2012



concepts such as *identification*, *alienation* and effective antagonisms. The chosen income thresholds are those that best distinguish the groups, to minimise internal differences within income groups and, as a result, maximise differences between these groups.

Setting the polarization sensitivity parameter at 1, figure 2-6 reports the estimated thresholds of the income distributions for 2006 and 2012.

The main evidence, as previously emerged with different methods, is a general impoverishment of the middle income group. Looking at the characteristics of the whole population between the two thresholds reported in table 2.6 (and not only considering household head's features as previously done) a substantial stability of the composition of the middle class is observable.

Table 2.6: Composition of the middle income group 2006-2012

		2006	2012
<i>Education</i>	Female	48.2	50.04
	Low educated	24.67	23.53
	Middle educated	29.73	35.91
	High educated	45.6	40.56
<i>Age</i>	Age <41	30.19	23.23
	Age 41-55	27.99	28.81
	Age >55	41.82	47.96
<i>Residential area</i>	North	58.33	55.43
	Centre	21.61	23.57
	South and Islands	20.05	21
<i>Occupational status</i>			
	Blue collar, production worker	24.22	21.47
	Clerical worker	22.72	22.62
	Managerial worker	3.02	3.14
	Self employed	9.8	8.39
	Pensioner and not employed	40.24	44.38
	Observations	5,223	5,310

The changes between periods are mainly related to the educational attainment (the quote of people with a high level education decreases despite an increase in the whole sample) and to the higher age of individuals in the middle group in 2012 who are retired in a greater proportion if compared with 2006.

2.5 Conclusion

The main issue we wanted to investigate in this Chapter was the evolution of the middle class in Italy over the recent years.

To provide an unambiguous analysis considering income, as to distinguish who belongs to the middle class, the techniques reviewed in Chapter 1 drawn from polar-

ization studies have been applied.

With reference to the information contained in the distribution of the Italian incomes from the SHIW dataset, it is easy to draw some conclusions regarding the last twenty years. In particular, we focused our attention to the period before and after the beginning of the economic crisis. To sum up, the empirical evidence has shown a significant impoverishment of households in the middle sector of the income distribution and an increasing distance between social categories. This has led to an unambiguous decrease of the middle class from 2006 to 2012. As empirical findings reveal, this latter evidence can be due to structural changes that need further investigation. Considering different population subgroups, the highest increase in polarization is observable for the self-employment income distribution.

Furthermore, the role of the individual characteristics in attracting people at the top or at the bottom of the distribution has been investigated. Findings of this latter analysis reveal that the main determinant to create homogeneity within groups and heterogeneity between groups is the educational attainment. This confirms the role of education to create and reproduce distinguishable social categories.

Finally, in the last Subsection, members of the middle class have been identified as resulting groups following Cruces, López Calva and Battiston, (2011). A substantial stability of the individual characteristics of the middle class has emerged, despite a significant impoverishment of this middle income group.

Obviously, our analysis is not exhaustive and many other aspects need to be included for a fully satisfactory analysis of the middle class. The following chapters aim to address some of these aspects.

2.6 Appendix A

Table 2.7: Decomposition of the DER polarization index by head of household's characteristics (2006)

	φ_g	ψ_g	P_g	Intra-group polarization				
				D	S	D/S	AC	RC
Occupational status								
Employed	0.5	0.489	0.19	0.062	0.038	1.615	0.046	0.234
Self employed	0.132	0.172	0.227	0.013	0.012	1.018	0.004	0.022
Pensioner and not empl.	0.368	0.338	0.198	0.049	0.025	1.954	0.025	0.127
Within-group							0.076	0.383
Between group							0.122	0.617
Education								
Low education	0.245	0.179	0.18	0.04	0.012	3.441	0.008	0.042
Middle education	0.294	0.251	0.189	0.041	0.019	2.198	0.015	0.073
High education	0.462	0.57	0.196	0.043	0.045	0.936	0.046	0.231
Within-group							0.069	0.347
Between group							0.13	0.653
Age								
Age <41	0.238	0.228	0.195	0.029	0.018	1.642	0.011	0.053
Age 41-55	0.339	0.34	0.204	0.042	0.025	1.637	0.023	0.117
Age >55	0.424	0.431	0.203	0.052	0.032	1.614	0.036	0.182
Within-group							0.07	0.352
Between group							0.129	0.648
Residential area								
North	0.491	0.555	0.187	0.05	0.045	1.122	0.047	0.237
Centre	0.201	0.225	0.201	0.021	0.018	1.215	0.008	0.042
South and Islands	0.308	0.22	0.203	0.052	0.013	3.886	0.015	0.074
Within-group							0.07	0.352
Between group							0.129	0.648

Notes: own calculation on weighted household income data from SHIW.

Chapter 3

Middle class income dynamics and mobility

3.1 Introduction

The media in Europe and the USA started to perceive the decline of the middle class many years before the economic recession. The attention in the public debate to the shrinking middle class has led to an increase in literature on polarization in economics which aims to investigate what evidence emerges from the distribution of incomes. For many years distributional studies have focused mainly on the poor and on the rich, leaving out the middle (Atkinson and Brandolini, 2013).

As we have seen in the previous chapters, the research on polarization reverses this perspective considering the middle group as a crucial element. Measures of polarization capture not only the degree to which income distribution spreads out from its center (Foster and Wolfson, 1992), but also the formation of some earnings groups (poles) around local means (Esteban and Ray, 1994). The polarization phenomenon is often considered dangerous as it signals a reduction of social cohesion and can lead to conflict. Furthermore, it appears very unpleasant because it is likely to trigger broader processes of segregation, which in turn implicate consequences that are not acceptable in terms of social justice (Franzini, 2010).

However, economic concerns on the malaise of the middle class not only depend on its absolute level of incomes and on the distance from other social groups since also vulnerability, defined as uncertainty and income volatility, can play a crucial role. The link between the concepts of economic stability and security and the middle class has been widely discussed by sociologists in social class analysis (Goldthorpe and McKnight, 2004) and recently it has been considered also by economists (Lopez-Calva and Ortiz-Juarez, 2014; Krugman, 2014).

In Italy it is particularly relevant to explore income dynamics of the middle income groups as the analysis of this dimension has helped to explain the puzzle between the empirical evidence of stability in distributional indices and the worsening of confidence and expectations experienced by Italian households in the 2000s before the financial crisis (Bagnasco, 2004; Boeri and Brandolini, 2004; Pisano and Tedeschi, 2007; Franzini, 2010). The evaluation of income volatility appears even more interesting in the context of the economic crisis which has lead to a general impoverishment and an increasing polarization of the distribution of income¹, given the fact that a literature on the consequences of the increasing distance between social groups on individual income dynamics is still lacking.

The aim of the Chapter is, therefore, to extend the analysis of the middle class towards an inter-temporal framework, by observing the mobility across different time periods of those belonging to the middle class.

By using longitudinal data, a picture of income dynamics for this group in Italy between 2002 and 2012 will be provided. This will be done exploring downward or upward mobility of the middle class and the relationship between changes in relative position and their determinants over time.

The Chapter is structured as follows. Firstly, the issue of mobility is considered

¹See Chapter 2.

exploring its connections with vulnerability and the analysis of the middle class and presenting some evidences from the existing literature. Secondly, distinguishing the different aspects of income mobility, a review of the studies on the concept of mobility that we intend to study is provided, considering the most adequate mobility measures to capture that concept (Section 2). In Section 3, data and methodological choices are briefly presented. Then, empirical results are discussed (Section 4). Finally, the last section (Section 5) proposes a summary of the main reflections emerged in the Chapter, pointing out the relevance of the consideration of the longitudinal component in the study of middle class.

3.2 Theoretical framework

3.2.1 Mobility, vulnerability and middle class dynamics

The concept of mobility is well established in the literature as witnessed by the number of proposed definitions and the wide range of mobility measures developed in order to obtain a quantitative assessment. As discussed in Pisano and Tedeschi (2007), the attempts to give a normative basis to mobility can be broken down into two groups. On the one hand, there are some studies that conceive mobility as a measure of the degree of fluidity of society. According to this view mobility represents a value to be pursued by itself. On the other hand, some literature considers mobility a fundamental requirement for economic efficiency, as a mobile society means that the skills are rewarded (rather than parental origins) and equality of opportunities are guaranteed. Furthermore, it has to be considered that mobility affects the level of social well-being in a long term perspective reducing inequality in the life-cycle and the persistence of poverty (Friedman, 1962).

However, mobility has also a negative connotation: this is the case when the

instability of income translates into greater vulnerability and insecurity of income prospects, which undermine people's well-being and aspirations as much as individuals are risk averse.

Hence, the final judgment on social mobility has to be determined by the aggregation of individual judgments. These latter depend on, among other things, the position occupied by each subject in society, the ability to deal with risk, especially in the case of imperfect markets, as well as the presence and the degree of protection offered by the social welfare (Pisano and Tedeschi, 2007).

A new stream of research in economics tries to consider all these aspects in the analysis of *vulnerability*. These studies shift their focus from current deprivation to insecurity and exposure to risk and shock. Hence, the concept of vulnerability has been mainly explored from the perspective of poverty traps and poverty dynamics. In particular, the pioneering study of Morduch (1994) gives consideration to the place of risk as a component of poverty. A range of approaches to measuring vulnerability at the macro level have been developed by international organisations such as the IMF, the UN and the World Bank. The World Bank (2000) sees vulnerability as reflecting the risk of experiencing an episode of poverty over time but also a heightened probability of being exposed to a range of risks. At a micro level Whelan and Maître (2010) identify groups who are vulnerable to economic exclusion in the sense of being distinctive in their risk of falling below a critical resource level, being exposed to life-style deprivation and experiencing subjective economic stress. Bradshaw et al. (2004) suggest that it is useful to distinguish elements contributing to such vulnerability between risk factors, which signal the greater vulnerability of a category of individuals, and triggers which have a direct causal impact.

Reversing the perspective that connects poverty to vulnerability, it is possible to state that a defining feature of middle-class status is a certain degree of economic

stability and resilience to shocks (Ferreira et al., 2012).

This latter point has been emphasised by Krugman (2014) who considers economic security, defined as the ability to maintain an appropriate consumption's profile and to face income's fluctuations, a fundamental attribute to falls within middle-class. Furthermore, López-Calva and Ortiz-Juarez (2014) develop their definition of the middle class for some Latin American countries fixing the lower income threshold where the associated probability of falling into poverty over a five-year interval is equal to 10 percent. According to the authors this value can be considered as the maximum level of insecurity for a household that can be identified as middle class. This approach has been followed also by a team of the Word Bank (Ferreira et al., 2012) in the Flagship Report of the World Bank "Economic Mobility and the rise of the Latin American Middle Class" where a middle class definition based on the notion of economic security validated by self-perceptions is adopted. This study is focused on the social transformation going on in Latin America middle class and is a fundamental reference exploring the relationship between mobility and class dynamics from an economic point of view.

On the basis on the same theoretical assumptions regarding the relationship between middle class and vulnerability, Torche and López-Calva (2013) examined the determinants of middle-class intra-generational mobility in Mexico and Chile for the 2000s. According to these authors, economic and political development is strictly dependent on the stability of the middle class.

Furthermore, the relationship between a large middle class and social cohesion is positive just in case of economic security, since a household which is highly vulnerable to poverty will not take all those actions that are considered to induce economic growth and political stability (Easterly 2001; Josten 2005; Murphy et al. 1989; Leatherman et al. 1999; Birdsall 2010). On the contrary, if the probability that

a middle-class household remains in its status over time is high, its investments in long-term well-being and political choices that support those investments are more likely.

But as pointed out by Torche and López-Calva (2013):

“It is important to indicate that middle-class stability is not an uncontested advantage. Stability implies the absence not only of downward mobility into poverty, but also of upward mobility into economic advantage. In other words, middle-class stability identifies high persistence in socioeconomic standing over time. This raises a normative question about which type of society is more desirable—one in which there is substantial fluidity so that the opportunity to fall or climb in the socioeconomic ladder is evenly distributed and households ‘take turns’ in advantage and disadvantage (Hout 2004) or one in which there is constancy over time? The answer is unambiguous when the question concerns poverty—the consequences of chronic poverty are worse than those associated with transient poverty. The answer is less clear, however, when we consider the middle class as it partly depends on the specific sources of stability and fluidity. Protection against shocks beyond families’ control is likely desirable, while ascriptive sources of stability such as those based on gender or race are more questionable (Hacker 2006; Jencks and Tach 2006)” (Torche and López-Calva, 2013).

However, in order to deal with this normative concern properly, the question of the level and determinants of stability and mobility of the middle class should be first addressed.

3.2.2 Concepts and measurement of economic mobility

The relevance of mobility has been often highlighted in social sciences and economics. It concerns the evolution over time of a given socioeconomic status from one time period or generation to another but, as it has often been observed, it is a multi-faceted concept that cannot be easily addressed (Fields and Ok, 1996).

The first question is: mobility of what? The choice of the indicator of social or economic status and of the recipient unit is a crucial preliminary step of any sort of mobility analysis. For brevity, in the next pages following Field (2008) we will refer to mobility of “income”, referring to income from all sources, among “individuals”.

Literature on income mobility² can be classified on the basis of different taxonomies of the mobility concepts. Fields (2008) distinguishes between *mobility as a movement*, *mobility as origin independence* and *mobility as equaliser of long term income*.

The former declination of the mobility concept associates a higher mobility with higher movements that can be observed between two distributions. It can be further divided into four subconcepts:

- *directional income movements* which seek to quantify the extent of fluctuation in individuals’ income not only considering the amounts of the income changes but also about their direction;
- *non-directional movements*, which capture the extent of fluctuation in individuals’ income;
- *share movements*, that are income’s rises or falls relative to the mean;

²See Fields and Ok (1996), Fields (2008) and Jäntti and Jenkins (2013) for a complete review of concepts and measurements of income mobility.

- *positional movements*, that seek to quantify movements of individuals among various positions in the income distribution (also referred as rank mobility).

The second concept *mobility as origin independence* considers a society more mobile whether one’s (or one parents’) initial position is less important to determine one’s future position. Differently, in the third case (*mobility as equaliser of long term income*) a more mobile society is intended as one in which individual income changes during lifetime have the effect to reduce income inequality in permanent incomes, defining permanent income as an individual’s average income across all life periods.

Similarly, Jäntti and Jenkins (2013) distinguish four concepts: *positional change* (which has two features), *individual income growth*, *reduction of longerterm inequality*, and *income risk*. The different concepts ‘standardise’ the marginal distributions x and y in different ways in order to focus attention on the nature of the link $x \rightarrow y$ (Jäntti and Jenkins, 2013; Jenkins, 2011).

According to these authors, *positional change* refers to “the pattern of exchange of individuals between positions” separately from any change in the shape of the distribution. In this case, we have a situation of “no mobility” when every person has the same rank in x and in y . However, there are two different ways that can describe a situation of maximum mobility: according to the first view, perfect mobility occurs when there is no correlation between one’s income origin and one’s income destination while according to the second, a society is perfectly mobile when destination positions are a complete reversal of origin position (“rank reversal”) (Jäntti and Jenkins, 2013).

Mobility as *individual income growth* refers to a measure that aggregates all the changes in income experienced by each individual within the society between two points in time, that can be gains or losses at the individual level. As pointed out in Jäntti and Jenkins (2013)

“income growth is defined for each individual separately and income mo-

bility for society overall is derived by aggregating the mobility experienced by each and every individual” (Jäntti and Jenkins, 2013, p. 8).

Thus, mobility for each person can be defined in terms of ‘distance’ between origin and destination income. Mobility for the whole population is 0 when the measure of distance equals zero for every individual ($z_{1i} = z_{2i}$ for all i). Mobility is greater than 0 if the distance between origin and destination is positive at least for one individual.

The third mobility concept defines income mobility on the basis of its *impact on inequality in longer-term incomes*. It is very similar to the declination of the mobility concept *mobility as equaliser of long term income* (Fields, 2008) already discussed, since the longer-term income for each individual is defined as the longitudinal average of incomes in each period. In case of two periods, longer-term income equals $\bar{z}_i = 1/2(z_{1i} + z_{2i})$ for each i (Jäntti and Jenkins, 2013).

Strictly related to this latter concept of mobility and to the *non-directional income movements* in Fields and Ok (1999) and Fields (2008), it is defined mobility as *income risk*. In this case, movements over time represent unpredictability and

“the transitory components³ represent unexpected idiosyncratic shocks to income, and the greater their dispersion across individuals each period, the greater is income risk for this population” (Jäntti and Jenkins, 2013, p. 11).

Furthermore, another important aspect that needs to be addressed is whether the context is intergenerational or intragenerational. In the intergenerational context, the recipient unit is the family, generally a parent and a child, and the aim is to monitor how the distribution of the individual status of interest changes between

³The period-specific deviations from average.

different generations in a given society. On the other hand, in the intragenerational context, the recipient unit is the individual or family at two different periods (Fields, 2008).

Any different income mobility concept needs a different measure but it does not mean that the indices which aim to measure the same concept behave uniformly, since “different indices measure different underlying entities” (Fields, 2008). As reported by Fields (2008), at least twenty mobility measures have been used in the literature.

Consequently, it is important to specify which concept or concepts of mobility are considered, which measures of these concepts are used, and which questions are addressed.

Our aim is to offer an aggregate picture of mobility of individuals who can be identified as middle class both in terms of individual status and in terms of individual position in the status distribution comparing two different time periods.

Thus, in order to investigate whether an increasing or a decreasing vulnerability for the middle class can be detected after the beginning of the current recession phase, data and methods adopted will be shortly presented in the next section.

3.3 Data and methodological choices

We study middle class mobility in Italy by using the longitudinal component of SHIW from the Bank of Italy. Data are drawn from the Historical Archive (HA) of the survey (version 8.0, released in January 2014) which enhances comparisons over time. In order to analyse income dynamics in an intragenerational context, we selected observations for which the data are available for at least two waves between 2002 and 2012.

As in Chapter 2, it is considered the sum of all cash incomes earned by the household including compensation of employees, pension and other transfer, income

from self-employment and entrepreneurial income and property income (income from financial assets, net of income taxes, social security contribution and imputed rents). Family income, rather than an individual measure, is used to account for the fact that most people share resources with other coresidents. However, in line with the literature on income distribution, the unit of observation is the individual and assuming as egalitarian intra-household distribution, the equivalent income of the household is attributed to each person to which he or she belongs.

To control for the fact that the same yearly income provides a higher standard of living for a single-person family than it does for individuals belonging to larger families, family income is adjusted by family size. This adjustment is made applying the Italian official equivalence scale. All incomes are valued in 2012 Euro using the deflator HED⁴. Furthermore, all records with zero income are dropped, and observations are bottom-coded at 1 percent of the mean of equivalent disposable income and top-coded at 10 times the median of unadjusted disposable income (e.g. Atkinson and Brandolini, 2013).

Our approach to investigate middle class mobility and its changes over time is composed of three stages.

The first stage observes individual income growth between different periods across the whole distribution using income mobility profiles (Van Kerm, 2006; 2009a). Then, after having identified the low, middle and high income groups, the second stage constructs probabilities of transition to one class to another, via transition matrices. In the third stage, we move to multinomial logit models in order to identify actual characteristics associated with movements in or out of the middle class. The procedures applied are described in the following paragraphs.

⁴See Chapter 2.

Income mobility profiles

To capture mobility at the individual level, we apply the mobility profiles, a graphical devices for summarise income mobility between two periods developed by Van Kerm (2009a).

Mobility profiles “provide evocative pictures of the underlying mobility structure” and are “appealing tools for depicting the structure of income mobility” (Van Kerm, 2009a). Furthermore, the use of these tools is the simplest way to observe income growth at the individual level between two periods. Directional income growth (Fields and Ok, 1999) is thereby detected converting the bivariate joint distribution to a univariate distribution of income changes (Jäntti and Jenkins, 2013).

According to Van Kerm (2006), we can assume that X and Y are two correlated random variables with joint distribution $F(x, y) = Pr[X \leq x, Y \leq y]$, describing the distribution of incomes at two time periods (base and final year) as a realization of (x, y) . If we let $d(x, y; F)$ be a distance function (a statistic that captures the degree of mobility experienced by an agent with incomes x, y), many of the most mobility measures can be expressed in the following way (Van Kerm, 2006):

$$M(X, Y) = \int_{z_-}^{z_+} \int_{z_-}^{z_+} d(x, y; F) dF(x, y) \quad (3.1)$$

where individual changes in income (from the base year x to the final year y) are summarised into a global scalar. Mobility depends on the information contained in the original and final year distribution, and on the specific choice of the distance function.

However, the use of a synthetic measure is not able to provide all the relevant information. In order to fill this gap, Van Kerm (2006) developed a procedure that “permits to investigate the pattern and sources of mobility in detail”.

The approach consists of different stages (Vittori, 2011). In the first stage, the analyst chooses the distance measure that can better represent the concept of mobility he/she intends to study.

Starting from the general form, a mobility profile can be obtained by rewriting equation 3.1 in terms of the base year of individuals' rank. Let F_X and F_Y be the marginal distribution function of X and Y and $F_{X|y}$ and $F_{Y|x}$ the respective conditional distributions.

$$M(X, Y) = \int_{z_-}^{z_+} \left(\int_{z_-}^{z_+} d(x, y; F) dF_{Y|x}(y) \right) dF_X(x) \quad (3.2a)$$

$$\equiv \int_{z_-}^{z_+} m(X, Y|X = x) dF_X(x) \quad (3.2b)$$

$$\equiv \int_0^1 m(X, Y|X = x(p)) dp \quad (3.2c)$$

The mobility profile is generated by plotting the expected mobility $m(p) = m(X, Y|X = x(p))$ over the individuals' ranks p in the base year, hence conditional on where individuals started in the base year distribution. Implementation of the method requires reliable estimation of the conditional expectation $m(p)$. In our case, the mobility profile are estimated using a locally weighted regression⁵.

The area underneath the curve, obtained by integrating the regression function with respect to the individual rank p , can be used as a measure of mobility.

In general, simply looking at the graphical representation it is possible to evaluate

⁵Following Vittori (2011), estimates are obtained in STATA using "locpoly" (Cleveland, 1979). This command performs a local polynomial regression which is a generalization of local mean smoothing as described by Nadaraya (1964) and Watson (1964) (Gutierrez, Linhart, Pitblado, 2003).

The rank is calculated using the "fracrank" command from Van Kerm (2009b). This procedure assigns the same rank to all tied values in income and it uses a formulation that ensures that the mean rank is set to 0.5 (the mean of a uniform distribution).

the overall mobility and to consider how income changes are distributed relative to people's position in the base period income distribution (Van Kerm, 2006).

In this way:

“it is therefore straightforward to identify, e.g., whether it is the rich, the poor or the middle class that experience greatest mobility and to assess their respective impacts on aggregate indices” (Van Kerm, 2009a).

Furthermore, an extension is derived from the profiles to incorporate concerns about the distribution of individual mobilities⁶.

In our empirical application, the distance measure adopted is the change in log income from year x to y , $d(x, y; F) = \log(y) - \log(x)$. In this way mobility reflects the growth of a person's income (*directional income movements*, Fields et al., 2002)⁷.

Transition matrices

Transition matrices are particularly useful devices for summarizing the mobility content of distributional transformations (Fields and Ok, 1999; Jäntti and Jenkins, 2013). They are able to provide a simple picture of the individual's “movement” among the specified income classes.

As reported in Fields and Ok (1999), having specified m income range by one criterion, the *transition mobility matrix* induced by a transformation $x \rightarrow y$ can be defined as the matrix

$$P(x, y) = [p_{rs}(x, y)] \in R_+^{m \times m}, \quad (3.3)$$

⁶See Van Kerm (2006, 2009) for a complete discussion and illustration.

⁷See Jenkins and Van Kerm (2006), Jenkins and Van Kerm (2008), Van Kerm (2009a) and Vittori (2011).

where $p_{rs}(x, y)$ is the proportion of people that from class r in the distribution x , have moved to class s in the second period. By definition, $\sum_{s=1}^m p_{rs}(x, y) = 1$ for all r .

To analyse the mobility of the middle class and its income volatility from a longitudinal perspective the main problem is how to identify this group. As pointed out in many studies (Foster and Wolfson, 1992; Esteban and Ray, 1994; Jenkins, 1995; and the following literature on polarization) and discussed in Chapter 1, arbitrary income intervals would appear somewhat unsatisfactory. Instead, members of the middle class are identified non-parametrically using kernel density procedures with the process of Esteban, Gradín and Ray in their study on polarization and as it has been suggested by Cruces, López Calva and Battiston (2011).

Applying this procedure, the definition of the middle class is related to the distribution of income but lower, middle and upper class are determined endogenously for each wave since the optimal income boundaries that separate each group from the others are calculated. Furthermore, fixing $n = 3$, the resulting groups are based on a theoretical framework within which concepts such as identification, alienation and effective antagonism⁸ are precisely defined (Cruces, López Calva and Battiston, 2011).

Hence, the discrete partition permits us to calculate transitional matrices between period t and $t + 1$.

Multinomial logit models

The discrete partition obtained with the procedure of Esteban, Gradín and Ray (2007) also permits the application of different multinomial logit models which investigate the determinants of downward and upward mobility for individual members

⁸See Esteban, Gradín and Ray (2007) for a complete analysis.

of the middle class at time t .

The multinomial logit model can be used when all the regressors are case specific (Cameron and Trivedi, 2010).

It specifies that

$$p_{ij} = \frac{\exp(x_i' \beta_j)}{\sum_{l=1}^m \exp(x_i' \beta_l)}, \quad j = 1, \dots, m \quad (3.4)$$

Where x_i are case-specific regressors, and the intercept. This model ensures that $0 < p_{ij} < 1$ and $\sum_{l=1}^m p_{il} = 1$.

To ensure model identification, β_j is set to zero for one of the categories, and coefficient can be interpreted with the respect to the base category. In our presentation of results, the parameters are transformed to odds ratios, where the odds ratio of being a member of category j rather than alternative 1 is given by

$$\frac{\Pr(y_i = j)}{\Pr(y_i = 1)} = \exp(x_i' \beta_j) \quad (3.5)$$

So $e^{\beta_{jr}}$ gives the proportionate change in the relative risk of being in j rather than in 1 when x_{ir} changes by one unit (Cameron and Trivedi, 2010).

Observable socio-demographic and socio-economic characteristics enter the vector x_i and the relationships between each characteristic and the dependent variable are thus studied.

Specifically, we estimate the impact of several variables on the probability of moving from the middle class downwardly and upwardly, using the immobile status as the reference category. We perform different models obtaining results for each type of transition, including socio-demographic characteristics (age class, sex, residential area, marital status, type of occupation, class of municipalities by resident population), variables related to the main source of income, variables related to com-

position of the household, and variables related to some main events experienced by individuals and households.

Following the classification developed in the pioneering paper of Bane and Elwood (1986), we distinguish economic events (those associated with changes in different types of income), and demographic events which include for example events modifying the number of household’s members (Polin and Raitano, 2014).

In particular, according to suggestions of many authors and drawing on the literature on poverty dynamics (Jenkins, 2000; Berthoud and Böheim, 1998; Jenkins and Schluter, 2003; Polin and Raitano, 2014), we identify some situations faced by households and we relate them to changes in their location across the income distribution, drawing on the idea that transitions out from the middle class are associated with “trigger events” (Polin and Raitano, 2014) – e.g. changes in household members, changes in occupational status of the head of household or changes in household composition – and these events have different impacts on the probability to move downwardly or upwardly from the middle class.

According to variables available in the longitudinal SHIW the events considered in this paper are the following:

- demographic events: changes in the number of household members, change in the individual marital status.
- Economic events: changes in the number of household earners, changes in the individual occupational status.
- Change in the head of household. Since in our case the head of household is defined as the main income earner this event is a hybrid case. It can be connected to a demographic event (death or divorce) or an economic event (intra-house earning variations which can be positive or negative). For these

reasons, we created a single dummy variable to be included in the model.

To simplify the interpretation of results, we aggregate “negative” events (e.g. increase of the number of individuals, decrease of income earners), and “positive” ones, distinguishing demographic and economic events. It is reasonable to assume that downward mobility is associated with negative events, whereas upward mobility is connected with positive events. These events occur when the associate variables changes between waves t and $t + 1$.

3.4 Empirical results

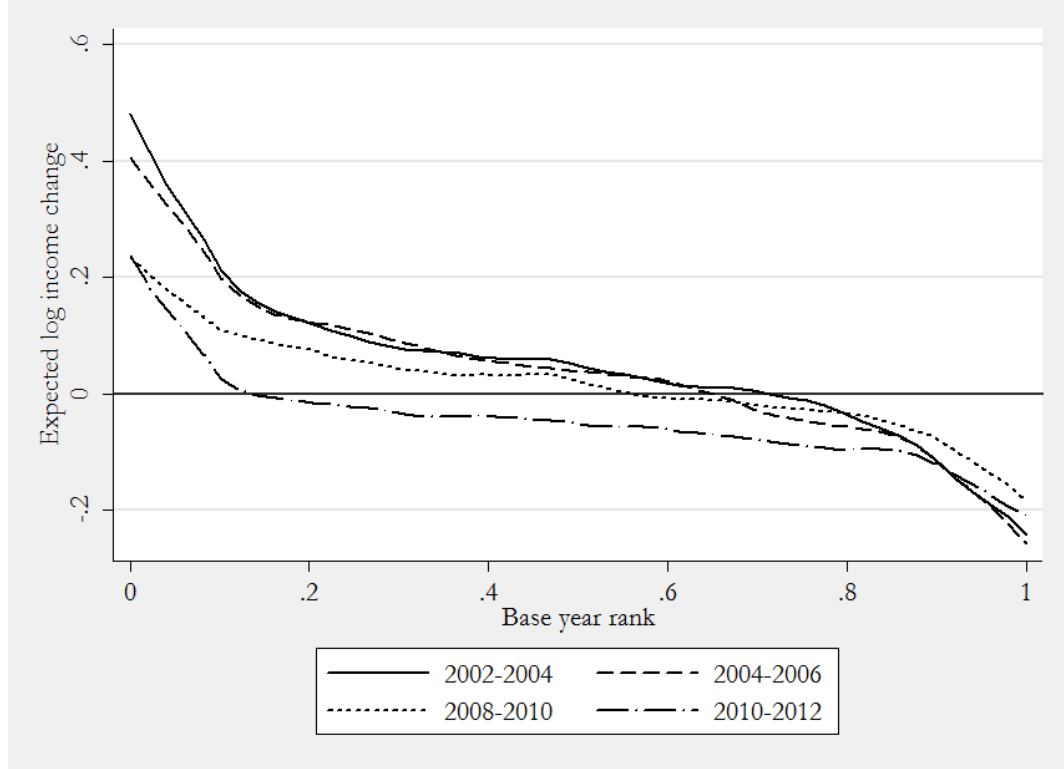
In this section empirical results are presented. Firstly, we analyse income mobility profiles which explore income dynamics for the whole population in different time periods. Then, on the basis of the partition of low, middle and high income classes that derives from the procedure of Esteban, Gradín and Ray (2007), we comment what emerges from transition matrices. Finally, results of the analysis of mobility of middle class members using multinomial logit models are shown.

3.4.1 Mobility profiles and transition matrices

To address the general question of how individual income dynamics have evolved over time, we draw the mobility profiles for different time periods in which the distance measure $d(x, y; F) = \log(y) - \log(x)$ indicates mobility as incomes share movements. With this graphical tool, we can observe individual earnings growth according to the initial base year rank.

In Figure 3-1, income mobility profiles estimated for the years 2002-2004, 2004-2006 and 2008-2010, 2010-2012 are represented.

Income mobility profiles show income growth in proportionate terms (the units

Figure 3.1: Mobiliy profiles

are log 2012 euro). In the graphs, the horizontal continuous line demarcates positive (above zero) and negative (below zero) income growth.

Mobility profiles are negatively-sloped for each of the four periods. As discussed in Jenkins and Van Kerm (2011), this means that, from a longitudinal perspective, “the pattern of individual income growth is progressive: the lower the rank in the base-year distribution, the greater the expected income growth” (Jenkins and Van Kerm, 2011, p. 17). In our case, it is important to observe that expected income growth is positive for the majority of individuals and negative for individuals in the richest part of the distribution in the base year until the period 2008-2010. On the contrary, in the last time frame considered (2010-2012) income growth is negative

for the majority of individuals observed and a significant impoverishment for the majority of the sample can be noticed. To sum up, average income growth for the population as a whole decreased in each period in proportionate terms, becoming negative in 2010–2012. This confirms that the worsening of the general living conditions perceived by the Italians also depends on an income reduction experienced with the financial crisis.

But what about transitions across classes?

Tables 3.1, 3.2, 3.3 and 3.4 report transition matrices for the years 2002-2004, 2004-2006, 2008-2010 and 2010-2012 respectively.

From the comparison between the transition matrices for the different periods interesting income dynamics emerge. Since the main diagonals identify the proportion of subjects who remain in the same class of income from one period to another, lower entry and exit rates between classes can be observed in the second time period (2008-2012). In particular, those who can be considered middle class in 2008 and in 2010 have a probability of staying in the middle class in the subsequent wave equal to 75,72% and 70,36% respectively, percentages significantly higher than the ones observed between 2002-2004 and 2004-2006 of 65,6% and 63,62%. Similarly, the members of the higher class persist in their status in around 76% of the cases since 2008, with a difference of more than 10 percentage points respect to the values observed six years before. Only those individuals in the lowest class show no significant change, even though the probability to become members of the high class for this group decreases overall.

Table 3.1: Transition matrix 2002-2004

		Destination 2004			
		Low class	Middle class	High class	Total 2002
Origin 2002	Low class	75.63	22.58	1.79	100
	Middle class	19.81	65.6	14.59	100
	High class	4.14	30.11	65.75	100
Total 2004		36.99	42.34	20.67	100

Table 3.2: Transition matrix 2004-2006

		Destination 2006			
		Low class	Middle class	High class	Total 2004
Origin 2004	Low class	77.67	20.24	2.1	100
	Middle class	18.64	63.62	17.74	100
	High class	5.84	29.9	64.26	100
Total 2006		40.51	39.45	20.04	100

Table 3.3: Transition matrix 2008-2010

		Destination 2010			
		Low class	Middle class	High class	Total 2008
Origin 2008	Low class	78.7	20.39	0.91	100
	Middle class	12.88	75.72	11.4	100
	High class	1.97	21.37	76.67	100
Total 2010		36.2	42.67	21.13	100

Table 3.4: Transition matrix 2010-2012

		Destination 2012			
		Low class	Middle class	High class	Total 2008
Origin 2010	Low class	77.09	21.94	0.96	100
	Middle class	13.03	70.36	16.61	100
	High class	2.63	20.95	76.42	100
Total 2010		35.63	41.84	22.54	100

3.4.2 Determinants of upward and downward mobility

The aim of this Section is to establish the main socio-economic determinants of downward or upward transition of the middle class in Italy considering two different periods before and after the beginning of the economic recession.

We run two different models: the first estimates the probabilities of moving towards the lower and higher classes controlling for characteristics of the individual and the household in the base year (state variables model), whereas the second includes the consideration of changes in some characteristics between the two waves (event variables model).

Tables 3.5 and 3.6 show estimated odds ratios and their statistical significance of the multinomial logit models, where immobile is chosen as the reference category. Hence, the estimated values reflect the effect of each covariate on the likelihood of becoming upwardly (or downwardly) mobile, relative to the possibility of remaining in the middle class (see also Albornoz and Menéndez, 2007).

In case of dummy variables, reference modalities are the following: owner for tenure status; an age of less than 41 for age group; low education for educational attainment; North for residential area; married for marital status; income from employment for main income source; less than 20,000 inhabitants for division of municipalities, absence of change of the head of household and of negative/positive demographic and economic events (grouped as it has been reported in the previous Section).

Findings reveal that estimated coefficients present the expected value above or below 1, being the probability to move toward the lower class significantly higher in both periods considered for individuals not home owners, living in the South or the Islands of Italy, belonging to families with a higher number of components.

Table 3.5: Determinants of downward mobility for the middle class in Italy. Multinomial logit models: estimated Odds Ratios.

	Downward mobility			
	2002-2006		2008-2012	
	State variables	Event variables	State variables	Event variables
Female	0.879	0.96	0.908	0.965
Tenant	1.888***	2.093***	2.401***	2.354***
Age 41-55	0.432***	0.489***	0.486***	0.600***
Age >55	0.550***	0.673**	0.441***	0.562***
Middle education	0.498***	0.491***	0.553***	0.537***
High education	0.307***	0.271***	0.339***	0.262***
Centre	1.172	1.166	1.499***	1.364***
South and islands	2.061***	1.970***	2.647***	2.511***
Single	0.557***	0.726**	0.608***	0.926
No longer married	0.746**	0.706***	1.019	1.046
Self employed	1.246	1.289	1.476**	1.651***
Pensioner and not employed	1.071	1.072	0.93	1.052
Income from self employment	1.129	1.027	2.618***	2.783***
Pensions and other transfers	0.864	0.969	0.909	1.07
Property income	0.818	0.812	1.939***	1.892***
From 20,000 to 40,000 inhabitants	0.971	0.928	0.781**	0.804*
From 40,000 to 500,000	0.788**	0.753***	0.806**	0.772**
More than 500,000	1.265*	1.038	1.798***	1.572***
Number of components	1.286***	1.479***	1.265***	1.571***
Number of income earners	0.621***	0.433***	0.633***	0.406***
Change head		1.211*		2.095***
Positive demographic event		0.93		0.450***
Positive economic event		0.438***		0.521***
Negative demographic event		3.917***		6.999***
Negative economic event		3.410***		5.688***
Constant	1.185	1.074	0.513***	0.344***
N. of observation	5,288	5,288	6,248	6,248

LR chi2(40) = 612.33

Prob > chi2 = 0.0000

Pseudo R2 = 0.0655

Significance level: * 90%; ** 95%; ***99%.

Source: own calculation on weighted household income data from SHIW, longitudinal component.

Table 3.6: Determinants of upward mobility for the middle class in Italy. Multinomial logit models: estimated Odds Ratios.

	Upward mobility			
	2002-2006		2008-2012	
	State variables	Event variables	State variables	Event variables
Female	1.09	1.093	1.062	1.043
Tenant	0.649***	0.630***	0.444***	0.428***
Age 41-55	1.311**	1.229*	1.805***	1.778***
Age >55	1.812***	1.603***	2.512***	2.216***
Middle education	1.409**	1.349**	1.494***	1.397***
High education	3.387***	3.483***	2.912***	2.850***
Centre	1.267**	1.303***	1.178*	1.133
South and islands	0.727***	0.759**	0.590***	0.583***
Single	1.036	0.859	1.547***	1.361**
No longer married	0.894	0.885	1.340**	1.236*
Self employed	1.345*	1.413**	1.400**	1.380**
Pensioner and not employed	0.926	0.957	0.924	0.967
Income from self employment	1.677***	1.778***	1.913***	2.038***
Pensions and other transfers	0.783*	0.775*	1.06	1.112
Property income	1.593**	1.586**	2.035***	2.141***
From 20,000 to 40,000 inhabitants	1.492***	1.450***	0.878	0.868
From 40,000 to 500,000	1.373***	1.337***	1.220**	1.237**
More than 500,000	1.087	1.119	2.765***	2.637***
Number of components	0.746***	0.635***	0.900*	0.773***
Number of income earners	1.325***	1.544***	1.413***	1.600***
Change head		1.433***		1.055
Positive demographic event		2.276***		2.935***
Positive economic event		2.180***		2.406***
Negative demographic event		0.402***		0.789
Negative economic event		0.535***		0.480***
Constant	0.095***	0.098***	0.027***	0.030***
N. of observations	5,288	5,288	6,248	6,248
LR chi2(40) = 612.33				
Prob > chi2 = 0.0000				
Pseudo R2 = 0.0655				

Significance level: * 90%; ** 95%; ***99%.

Source: own calculation on weighted household income data from SHIW, longitudinal component.

Conversely, the probability to become members of the higher class is positive for individuals who have a higher educational attainment, are self employed, live in municipalities with a population between 40,000 and 500,000 inhabitants and belong to a family with a higher number of income earners.

As expected, the occurrence of demographic and economic negative events increases the risk of moving to the lower class and decrease the probability to move upwardly, while the opposite is observable in case of positive economic and demographic events (even though there is not coefficient consistency over time for the occurrence of demographic events). Female dummy and the characteristic of being a pensioner or not employed do not result statistically significant in all models.

Looking at results' differences between the two periods other interesting patterns emerge.

Being self-employed and being in a household with self-employment as the main income source is positively related with both being upward or downward mobile in the second period. This evidence confirms the rise of polarization for this group of individuals as it has been observed by recent literature (Massari, Pittau and Zelli, 2009) and in Chapter 2 of this thesis. Similarly, after 2008, the same trend is detected for individuals living in municipalities with more than 500,000 inhabitants and belonging to families where the highest portion of income comes from property.

Concerning the educational level, in general we observe that having a tertiary education (high education) is significantly and positively related with being upwardly mobile, but this probability is much lower in the second period than in the first. On the contrary, being older than 55 years old shows an increasing positive effect on the probability of becoming an upwardly mobile and an increasing negative effect on the probability to move to the lower class.

In the period 2008-2012, the association between the occurrence of the change

of the head of the household has a higher significant positive effect on the risk to move downwardly, whereas it does not have any effect on the probability to become a member of the higher class.

Furthermore, the probability to move downwardly in case of the occurrence of negative events⁹ has significantly increased relative to staying immobile after 2008, while the probability to move upwardly in case of experiencing positive events shows just a slight increase.

Overall, these findings reveal a growing vulnerability for some groups of individuals in the second period despite an increasing stability for others. In particular, negative events play a greater role in determining transition downwardly from the middle class, while the occurrence of positive events does not increase the chances to move to the higher class over time.

3.5 Conclusion

The consideration of income dynamics is particularly relevant in the analysis of the middle class since, as pointed out by the literature, a defining feature of middle-class status is a certain degree of economic stability and resilience to shocks (Ferreira et al., 2012).

Furthermore, regarding the Italian case, the increasing discontent observed in the 2000s within this group has been considered dependent on a rise of uncertainty and income volatility.

This Chapter provided a picture of income dynamics and mobility with a focus on individuals who can be identified as middle class, using SHIW panel data.

In contrast with the traditional measures of classes based on arbitrary partitions

⁹The percentage of people who experience this kind of events don't show significant variations, see table in the Appendix.

of the distribution, we identified middle class with the calculus of the optimal income boundaries to separate this group from the others drawing from the process implemented by Esteban, Gradín, and Ray (2007).

The empirical analysis focused on mobility in different periods, comparing results between 2002-2006 and 2008-2012. As a first step, income mobility profiles have been adopted to observe income growth at the individual level between two periods, since individuals' average income change is plotted against their normalised rank in the base-year distribution.

By means of the transition matrices, we also shed some light on how growth (positive or negative) is distributed across the population and what that means in terms of class dynamics. Then, running two different multinomial logit models we investigated the determinant of upward and downward mobility for the middle class.

Also, as we must be cautious interpreting our results since we are measuring short term income mobility (incomes fluctuate in the short run and measurement error is likelier to bias the results), the methods applied enable us to draw out some general key facts. First of all, a situation of general impoverishment accompanied by an increased immobility across classes is outlined. Secondly, a higher vulnerability can be observed for some groups of individuals who significantly increase their probability to move downwardly. In particular, this is the case of people experiencing negative events.

3.6 Appendix B

Table 3.7: Share of individuals experiencing a significant event between two waves

Period	Change in the household head	Positive demographic event	Negative demographic event	Positive economic event	Negative economic event
2002-2004	17.65	12.93	4.31	12.07	15.44
2004-2006	18.26	12.58	7.73	13.84	17.16
2008-2010	15.27	9.94	3.89	10.21	12.87
2010-2012	14.98	11.99	5.09	9.89	13.76

Chapter 4

An analysis on self perceived social position

4.1 Introduction

The importance of the perceptions of individuals of their position in society has been emphasised by sociologists (Hodge and Treiman, 1968; Jackman and Jackman, 1973; Wright and Singelmann, 1982) in social classes' analysis. These authors argue that no consideration of social class is complete without taking into account a person's sense of self, as it may not coincide completely with objective reality but is likely to affect behaviour and choices. Similarly, Akerlof and Kranton (2000) considered how identity affects economic outcomes and incorporated the psychology and sociology of identity into an economic model of behaviour. Furthermore, Rizzello (2000), following Hayek's intuitions, took the view that knowledge is the fruit of an "endogenous construction" and that perception represents the source of the unpredictability of behaviour, and the cornerstone of economic change.

The match between perception and reality can depend on many different elements across societies over time.

Paul Krugman in a recent article begins claiming that:

"One of the odd things about the United States has long been the im-

mense range of people who consider themselves to be middle class - and are deluding themselves. Low-paid workers who would be considered poor by international standards, say with incomes below half the median, nonetheless consider themselves lower-middle-class; people with incomes four or five times the median consider themselves, at most, upper-middle-class” (Krugman, 2014).

Some literatures examines what the main drivers of the declared position in society are (Vanneman and Pampel, 1977; Evans and Kelley, 2004; Lindemann, 2007; Lora and Fajardo, 2011; Andersen and Curtis, 2012) and explore the consequences of self perceived social position on people’s values and attitudes.

The goal of this Chapter is to introduce the consideration of self perception in the analysis of the middle class.

In particular, we aim to extend the analysis from the level of people’s self-declared position in society to the inequality observed within this variable. The reported values of people’s perception of where they fit in social hierarchy from the International Social Survey Program (ISSP), drawing data from 14 countries, are considered to investigate what the main drivers of the inequality observed within communities are. The purpose of the analysis is to evaluate the different impact of covariates on people’s judgment of their relative social condition, verifying the answers’ heterogeneity and to what extent the shape of the distribution of people among the scale depends on some individual features. In this way it is possible to make some considerations of people’s perception of social structure and the possible effects on behaviour and choices.

The Chapter is organised as follows: in the first part a review is provided of the literature on the determinants of self perceived social position that points out the huge number of factors playing a role on subjective social location. In the second

part, in two main steps, the contribution of a set of covariates in levels and over time change of inequality is identified and quantified. The first step investigates using the Recentered Influence Function (RIF) regressions for two time periods (1992 and 2009) how age, gender, education, status and profession increase or decrease the variance and the Gini index of the variable “declared position on social scale”. In the second step, we identify and quantify the role of the covariates in shaping the evolution over time of subjective social position inequality, by means of the decomposition method proposed by Fortin, Lemieux and Firpo (2011) which is a generalisation of the Oaxaca-Blinder procedure and can be applied to any distributional parameter other than the mean.

Finally, in Section 6 letting evidences from subjective perceptions of personal position across societies interact with the previous analysis of the middle class, some conclusions are drawn.

4.2 Literature review

Self perceived social position indicates people’s own opinions of their location in society. A significant amount of literature examines what the main drivers are of the declared position in society and the consequences on people’s values and attitudes.

From a theoretical point of view, Marx identified the relations of production as the most influential factor of the individuals’ perception of the exterior world. As resumed by Morrison (2006, p. 72):

“Marx believed that our perception of the world is always conditioned by the terms under which we produce and the roles we play in economic production [...] More specifically, the terms under which we work for our livelihoods condition our perception of the word, and this means that our

apprehension of reality is conditioned by our location in a social class and the perception of others in relation to this class location”.

So, as pointed out by Evans and Kelley (2004), there is a clear connection between the objective conditions of production in capitalist society and the workers’ consciousness of their position across the social scale (e.g. Marx 1844; Marx and Engels 1968, p. 37). Similarly, objective circumstances are relevant into subjective perceptions in the Durkheim’s approach to the study of society (1933, p. 187-190, 256-263).

However, Marx and Durkheim had different theories about the possible evolution of objective circumstances over time and, consequentially, of reflection on individuals’ self perception.

On the other hand, the “reference-groups hypothesis” images a society which is more stable over years with a large part of people who tend to locate themselves at the middle. According to this view, people’s perceptions of their place in the social hierarchy strongly depend on people around them like familiars, friends, and co-workers (Stouffer et al. 1949). Typically within these networks individuals are quite homogeneous and most people see themselves as average and unexceptional.

According to the clarification given by Evans and Kelley (2004):

“This is a special case of the ‘availability heuristic’ – a tendency to build one’s image of the larger society by generalizing from one’s own experience and from familiar images prevalent in the media. The crux of the argument is that the homogeneity of reference groups – the similarity among one’s family and friends in education, occupation, and income – fundamentally distorts the “subjective sample” from which one generalizes to the wider society and in terms of which people develop perceptions

of their subjective location. Taken together, these lead to images of society with few at the top, the great majority in the middle, and few at the bottom. In this view, perceptions of the shape of the social stratification system and of one's place in it are only loosely linked to objective circumstances, since objective conditions are filtered through the distorting lens of reference groups" (Evans and Kelley, 2004, p.4).

Some empirical analyses examined the relations between a number of factors, at both micro and macro level, and people's own opinions of their location in society.

One of the first studies was conducted by Hodge and Treiman (1968) who investigated the impact of different socioeconomic characteristics on the subjective social position declared. Their results suggested that education, main earner's occupation, and family income are very influential on class identification but they also demonstrated that patterns of acquaintance and kinship between various status groups influence the position declared. According to this evidence, the two authors criticised the interest theory of classes in sociology because this latter neglects the great range of between-class contacts and exaggerates the role of economic position in the formation of class consciousness.

Vanneman and Pampel (1977) observed the relationship between occupation and class self-identification. Their study concluded that people perceive themselves as "working class" or "middle class" according to a manual-non manual working dichotomy more than to a continuous prestige scale. This result contributed to reorient the sociological debate between continuous and discontinuous models of the stratification system in favor of the latter.

More recently, Yamaguchi and Wang (2002) considered the interplay between class identification and family/gender, testing the relationship between married women's class identifications and their objective class situations in the United States. What

emerges is that class identification depends equally on the spouses' income but only the husband's occupational prestige affects subjective social class. Furthermore, men and women assign a different role to education when they assess the subjectively identified class.

The work of Evans and Kelley (2004) investigated subjective social status using data from surveys collected from representative national samples in 21 countries. The authors found that in all societies there is a pronounced tendency to see oneself as being in the middle, and this tendency holds in rich nations as well as in poor ones. The economic condition of individuals, the wealth of nations, and the national level of unemployment all have substantial effects on subjective status, but their effects are muted by the tendency to see oneself as being in the middle of the hierarchy with important implications for class identity and democracy. This fits with the "Reference group and Reality (R&R) – blend" hypothesis, developed by Kelley and Evans (1995), according to which individuals develop perceptions and self-images looking at their reference group, fairly homogeneous with respect to themselves. This homogeneity means that most people are encouraged to declare middle categories, overestimating the number of person with the same features (Kelley, 1967; Kahneman, Slovic and Tversky, 1982).

Similarly, Lindemann's empirical study (2007) is focused on Estonian society to find out what kinds of assets and resources affect people's opinion of their position in society.

Coherently with some of the studies already mentioned, the analysis shows that, also in Estonia, income is the most important determinant in shaping people's opinion of their social position. More interesting evidence is that in Estonia the significant impact of age on subjective social status is confirmed, but, contrary to what is observable in the Western countries (Yamaguchi and Wang, 2002), being younger

increases the probability of identifying with the higher positions.

Furthermore, Andersen and Curtis (2012) using cumulative logit mixed models fitted to World Values Survey data from 44 countries explored the impact of economic conditions, both at the individual-level and the national-level, on social class identification. Consistent with previous research, they found a positive relationship between household income and class identification in all countries explored, though this relationship varies substantially. They also found that income inequality has an important polarising effect on class identification and, specifically, the relationship between household income and class identity tends to be strongest in countries with a high level of income inequality.

Another significant analysis was conducted by Lora and Fajardo (2011) who provided a set of comparisons between objective (based on statistically measurable characteristics such as income and consumption) and subjective definitions of middle-class using data from the 2007 World Gallup Poll. Seven objective income-based definitions of social class were contrasted with a self-perceived social status measure. One of the conclusions is that mismatches between the objective and the subjective classification of social class result from the fact that self-perceived social status is associated not just with income, but also with personal capabilities, interpersonal relations, financial and material assets, and perceptions of economic insecurity.

4.3 Sample and descriptive findings

The International Social Survey Programme (ISSP) is a continuing annual programme of cross-national collaboration on surveys covering topics important for social science research. The ISSP Social Inequality module deals with different attitudes towards income inequality, views on earnings and incomes, legitimization of inequality, career advancement by means of family background and networks, social

cleavages and conflict among groups, and the current and past social position.

For the aims of this research the data are drawn from the second and the fourth survey, referred to 1992 and 2009 respectively, from which we can draw a question on the subjective position on the social scale and socioeconomic characteristics of the respondents. Selecting countries for which the data are comparable across all variables and excluding the individuals for which at least one variable of the analysis is missing, the observations in our sample are 14,744 for the first period and 14,121 for the second period. Fourteen nations are included: Australia, Austria, Bulgaria, Czech Republic, Germany, Hungary, Italy, New Zealand, Norway, Poland, Russia, Slovenia, United States and Great Britain. Internal weights, supplied by the ISSP to achieve distributions on key variables that are consistent with those found in the populations, are used in analysing the survey data.

The main variable of interest, Subjective Social Position, is the reported answer to the question:

In our society there are groups which tend to be towards the top and groups which tend to be towards the bottom. Below is a scale that runs from bottom to top. Where would you put yourself now on this scale?

In all countries, social strata were labeled consecutively from 1 to 10 with 1 at the bottom and 10 at the top, as a categorical ordered variable.

Coherently with some of the previously overviewed literature, most people tend to locate themselves in the middle categories and, some exceptions excluded, the highest share of people answers category 5 or 6 (figure 4.1). On average, after a time span of 17 years, the subjective social position declared has slightly increased, passing from a mean of 5.10 observed in 1992 to a mean of 5.30 in 2009.

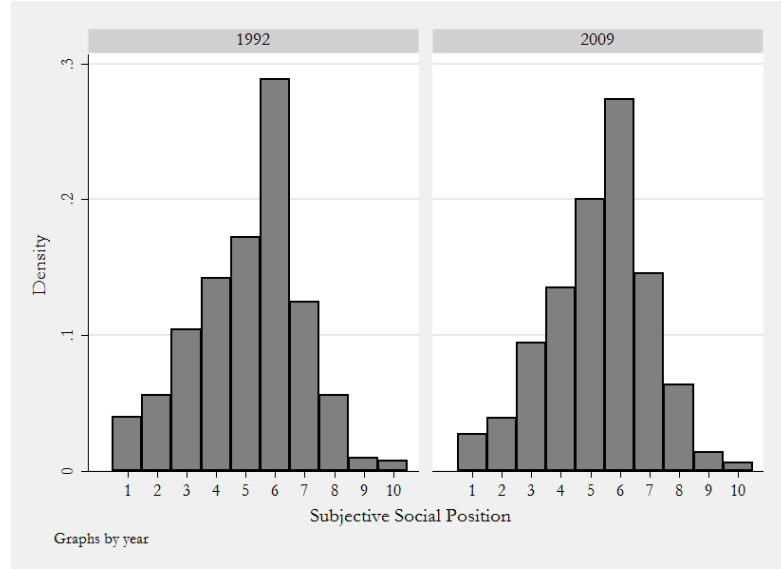
Figure 4.1: Distribution of self perceived social position by year

Table 4.1 reports the distribution of the selected covariates across our sample in the two periods and the mean of subjective social position declared within each category.

Considering the differences in observable covariates across groups in the two different years, it is possible to observe that: i) the percentage of postsecondary educated has grown to 33% in 2009 compared to the 19,4% of 1992 increasing the average level of education; ii) the proportion of the total population in different age groups has significantly changed, since the percentage of people over 45 increased and the proportion of youth has fallen; iii) the shares of the widowed, the separated, the divorced (included in the variable “no longer married”) and of those single increased, while the percentage of married fell from 70% to 57%; iv) regarding the employment status, there is a lower percentage of full-time workers that passed from 61.2% in the year 1992 to 57.8% in 2009, while the shares of part time workers, unemployed, retired, disable and other inactive increased.

Table 4.1: Composition of the sample and means of self perceived social position declared by categories

	1992	Mean of position declared 1992	2009	Mean of position declared 2009
Female	0.5	5.01	0.518	5.21
<i>Education</i>				
Low educated	0.31	4.54	0.154	4.37
Middle educated	0.495	5.17	0.514	5.17
High educated	0.194	5.84	0.333	5.91
<i>Age</i>				
Age 16-24	0.08	5.25	0.075	5.36
Age 25-34	0.227	5.24	0.172	5.42
Age 35-44	0.247	5.16	0.192	5.38
Age 45-54	0.187	5.16	0.198	5.31
Age 55-64	0.13	4.81	0.177	5.3
Age over 65	0.1	4.8	0.171	5.02
<i>Marital status</i>				
Married	0.704	5.13	0.57	5.45
Single	0.224	5.12	0.311	5.14
No longer married	0.073	4.76	0.119	4.98
<i>Occupational status</i>				
Full time worker	0.612	5.25	0.527	5.58
Part time worker	0.086	5.26	0.097	5.41
Unemployed	0.043	4.31	0.049	4.29
Student	0.019	5.83	0.018	5.74
Retired	0.158	4.6	0.227	4.91
Housewife,-man	0.056	5.28	0.042	5.33
Disable	0.01	3.88	0.021	4.05
Other inactive	0.015	5.14	0.02	5.02
<i>Profession</i>				
Profession low skill	0.12	4.34	0.097	4.44
Profession medium skill	0.689	5.01	0.661	5.17
Profession high skill	0.191	5.91	0.243	5.99
Observations	14,744	5.1	14,121	5.3

Notes: ISSP weighted data, Social Inequality module.

But how do individuals distribute among the entire social scale? How many people declare himself as middle class? There is an increasing homogeneity or heterogeneity in people's answers?

In this respect, the variance and the Gini index of the variable "declared position" are calculated across the whole sample to explore the inequalities between people's perception. Both these distributional parameters decreased in the period considered: the variance diminished by around 9.98%, from 3.32 to 3.02, while the Gini index reduced from 0.20 to 0.18 (-9.14%).

4.4 The decomposition approach

In this Section, it is shown how to formally break down changes in the distribution of the variable subjective social position into the contribution of each group of covariates using the recentered influence function (RIF) regression approach introduced by Firpo, Fortin, and Lemieux (2009).

This method is similar to the a Oaxaca-Blinder decomposition for the mean of a distribution (Oaxaca, 1973; Blinder, 1973) but, instead of recurring to a standard regression, the RIF-regressions allow us to perform the same kind of decomposition for any distributional parameter for which an influence function can be computed, including the variance and the Gini index.

Let be Y_{i1} be the declared position of an individual i observed in the period 1, and Y_{i0} the corresponding value in period 0. For each individual i the category declared across the social scale is given by $Y_i = Y_{i1} \cdot T_i + Y_{i0} \cdot (1 - T_i)$, where $T_i = 1$ if individual i is observed in period 1 and $T_i = 0$ otherwise.

In a standard Oaxaca-Blinder decomposition, the overall differences in means over time $\Delta_o^\mu = \mu_1 - \mu_2$ is broken down into two different components, the first related to the change in the returns of the set of covariates, defined the coefficient or structure

effect Δ_S^μ and usually called the “unexplained” effect in Oaxaca decompositions, and the second determined by the different distribution of the covariates, the composition effect Δ_X^μ . The detailed decomposition allows the subdivision of the contribution of each covariate to these two effects into the respective contributions of each covariate, $\Delta_{S,K}^\mu$ and $\Delta_{X,K}^\mu$.

Fortin, Lemieux and Firpo (2011) proposed the RIF-regression method that allows us to perform a detailed decomposition for any distributional statistics for which an influence function can be computed. A RIF-regression is similar to a standard regression but the dependent variable Y , is replaced by the (re-centered) influence function of the statistic of interest. The RIF is the sum of the distributional parameter of interest and the influence function $IF(y; v)$. This latter measures the relative effect of a small perturbation in the underlying outcome distribution on the statistic considered, detecting the contribution of each observation to the distributional parameter of interest (Hampel, 1974).

Because the expected value of the $RIF(y; v)$ coincides with the statistic of interest, the law of iterated expectations permits to express the distributional parameter v in terms of the conditional expectations of the RIF on the covariates X :

$$v = E[RIF(Y; \nu)] = E_x\{E[RIF(Y; \nu)|X]\} \quad (4.1)$$

$$E[RIF(Y; \nu)|X] = X\gamma^\nu \quad (4.2)$$

Where the parameter γ^ν can be estimated by the OLS regression.

In this way, it is possible to decompose the overall difference over time of ν , $\Delta_o^\nu = \nu_1 - \nu_2$ into a coefficient (Δ_S^ν) and composition effect (Δ_X^ν), since $\Delta_o^\nu = \Delta_S^\nu + \Delta_X^\nu$ where:

$$\begin{aligned}\Delta_S^\nu &= E[X|T=1]'(\gamma_1^\nu - \gamma_0^\nu) \\ \Delta_X^\nu &= E[X|T=1] - E[X|T=0]'\gamma_0^\nu\end{aligned}\tag{4.3}$$

However, a limitation of this decomposition, as discussed in Barsky et al. (2002), is that it provides consistent estimate only in the case of a linear specification of the conditional expectation, like is expressed in equation 4.2. The solution to this problem has been proposed by Fortin, Lemieux and Firpo (2011) and suggests to use a (non-parametric) re-weighted approach as in DiNardo, Fortin and Lemieux (1996) to decompose the different effects. Indeed, by reweighting it is possible to construct a counterfactual distribution $F_{Y_A^C}(\cdot)$ that replaces the marginal distribution of X for group A with the marginal distribution of X for group B using a reweighting factor $\Psi(X) = \frac{\Pr(T=1|X)/\Pr(T=1)}{\Pr(T=0|X)/\Pr(T=0)}$.

In the case of two different periods, we may be interested to what would be the distribution of the variable investigated at time 0 if individuals had the same X 's as time 1: applying this procedure we can obtain a distribution of X 's in the first period equal to the distribution in the second period, so that observations that were relatively more likely in the first year than in the last are weighted up and observations that are relatively less likely are weighted down.

Then it is possible to estimate the counterfactual mean \bar{X}_{01} and the counterfactual coefficients $\hat{\gamma}_{01}^\nu$ from the regression of the $RIF(y; \nu)$ on the reweighted sample. Consequently, the difference $\hat{\gamma}_1^\nu - \hat{\gamma}_{01}^\nu$ reflects a true change in the relationship that

links the covariates to the outcome.

In practice, they are estimated by constructing a third sample, which in this case will be the sample of individuals at time 1 with the weights of individuals at time 0, sample 01.

The detailed reweighted decomposition is thus obtained by running two Oaxaca-Blinder decompositions (Fortin, Lemieux and Firpo, 2011):

1. a decomposition with sample 0 and sample 01 to get the pure composition effect,
2. a decomposition with sample 1 and sample 01 to get the pure coefficient effect.

So, the first effect can be divided into a pure composition effect ($\Delta_{X,P}^\nu$) and a component measuring the specification error ($\Delta_{X,e}^\nu$):

$$\begin{aligned}\Delta_{X,R}^\nu &= (\bar{X}_{01} - \bar{X}_0)\hat{\gamma}_0^\nu + \bar{X}_{01}(\hat{\gamma}_{01}^\nu - \hat{\gamma}_0^\nu) \\ \Delta_{X,R}^\nu &= \Delta_{X,p}^\nu + \Delta_{X,e}^\nu\end{aligned}\tag{4.4}$$

While the second effect can be expressed as:

$$\begin{aligned}\Delta_{S,R}^\nu &= \bar{X}_1(\hat{\gamma}_1^\nu - \hat{\gamma}_{01}^\nu) + \bar{X}_1 - \bar{X}_{01})\hat{\gamma}_{01}^\nu \\ \Delta_{S,R}^\nu &= \Delta_{S,p}^\nu + \Delta_{S,e}^\nu\end{aligned}\tag{4.5}$$

So, the overall change is given by:

$$\Delta_o^\nu = \Delta_{X,p}^\nu + \Delta_{S,p}^\nu\tag{4.6}$$

In the final stage, the two components are further divided into the contribution of each explanatory variable using novel recentered influence function (RIF) regressions. These regressions estimate directly the impact of the explanatory variables on the distributional statistic of interest.

4.5 The empirical analysis

In this section the methodology followed by Becchetti, Massari and Naticchioni (2013) in their econometric analysis of the drivers of happiness inequality is replicated and two different researches are carried out. The first investigates using the RIF regressions the impact of some individual characteristics on the subjective social position inequality. This latter is measured by the variance and the Gini index. These traditional indices, as pointed out by Allison and Foster (2004), are problematic with ordered variables but in this work we assume the cardinality of this data. Indeed, as observed by Kobus (2013), this approach is very usual in the studies of non-income data, such as the self-reported health status data (Apouey, 2007; Zheng, 2011) and the happiness data (Di Tella and McCulloch, 2006; Diener et al., 1999; Frey and Stutzer, 2002; Kahneman and Krueger, 2006; Layard, 2005; Oswald, 1997; Becchetti, Massari and Naticchioni, 2013) where the regression results are very similar to the ones obtained considering the variable of interest as ordinal (Van Praag and Ferrer-i-Carbonell, 2004).

The second analysis identifies and quantifies the role of the individual characteristics in shaping the evolution over time of subjective social position inequality, by means of the decomposition method proposed by Fortin, Lemieux and Firpo (2011). Given the fact that the structure of the variance is dependent on the mean, the means of the distributions in 1992 and in 2009 are imposed to be equal to capture the right contribution of each covariate to the changes in the inequality observed.

The logit model used in the computation of the reweighting factor is estimated with a rich specification including additional interaction terms. The reweighting approach performs well in the sense that the reweighted means of the covariates for the base period are very close to those for the end period.

4.5.1 Determinants of self perceived social position inequality

The distribution of people among the hierarchical scale depends on some individual features: society can be conceived as an amalgamation of groups, where certain individuals are similar and others differ relative to some given set of attributes or observable characteristics which have an influence on self perceived social position. This part of the thesis explores which the main drivers are of the inequalities of people's perceptions of their position in society comparing two different years, 1992 and 2009.

As we can observe from figure 4-2 to figure 4-4 where is reported the variance for the two periods across some groups, there is an increasing homogeneity of people's answers according to age, educational levels, employment status and profession. In particular, the variance of self perceived social position by age classes is significantly lower in 2009 than in 1992: for the age class between 55 and 64 years old the variance passed from 3.57 to 2.89. Similarly, the categories of self perceived social position declared by the employed in 2009 are closer to the mean, since the variance decreased by 18%, from 3.05 to 2.56.

Figure 4.2: Variance of self perceived social position by educational level.

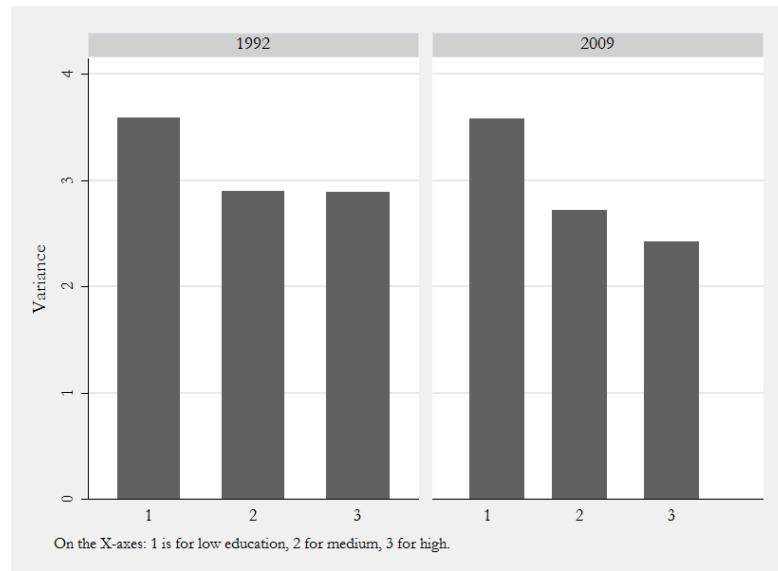


Figure 4.3: Variance of self perceived social position by employment status.

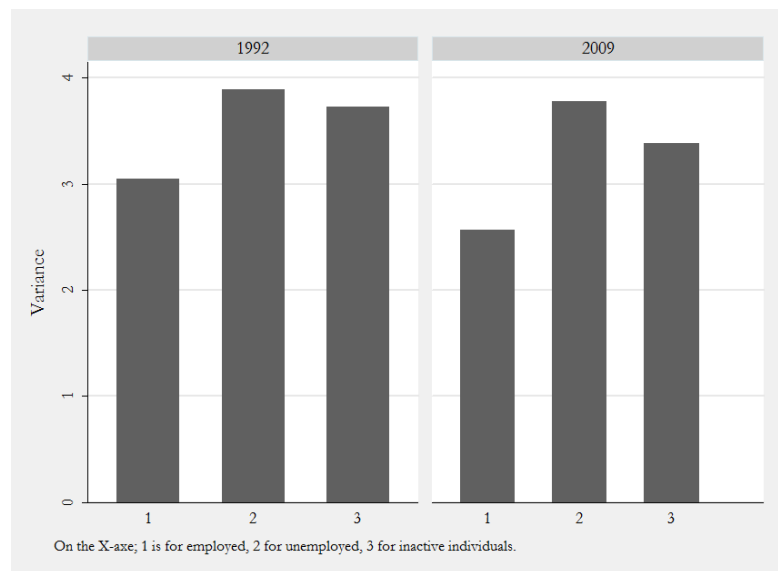


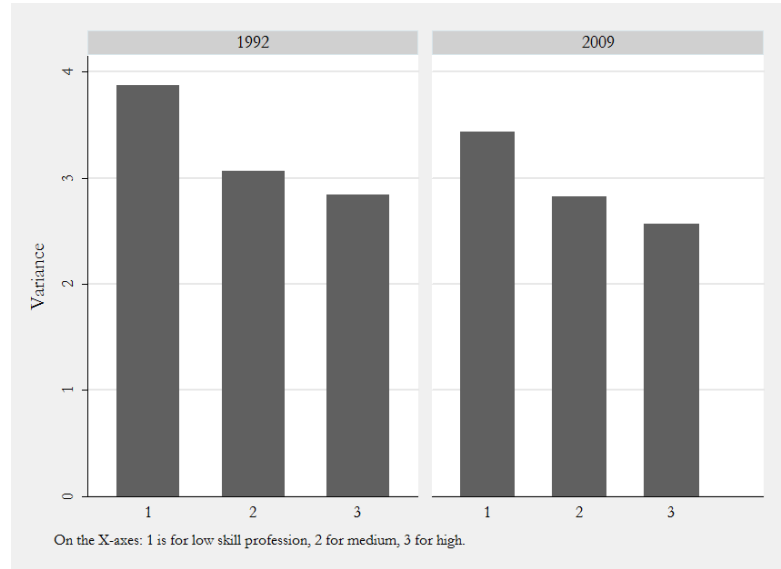
Figure 4-4: Variance of self perceived social position by profession.

Table 4.2 and table 4.3 report the results of the RIF regressions for both period considered, for the variance and the Gini index. The covariates included in the regressions reflect the different individual characteristics that have been suggested by the literature previously reported. The key set of variables on which we focus are gender, age (six groups), education (three education groups), marital status (three groups), occupational status (six categories) and three hierarchical categories of profession (carried out in the present or in the past) constructed by the International Standard Classification of Occupation code, ISCO-88. Unfortunately, if ISSP also includes questions for income, this variable was not included in the models given the difficulty to obtain comparable data¹. Note that the base group used in the RIF-regression models consists of male, aged over 65, highly educated, married, in full time employment and profession highly skilled.

¹The ISSP asks for income classes but classes are not equal across countries.

Table 4.2: RIF Regressions for the two periods, for variance

	1992			2009		
	Coeff.	t		Coeff.	t	
Female	0.001	0.49		0.002	0.59	
Age 16-24	0.004	0.5		-0.02	-2.77	***
Age 25-34	0.005	0.75		-0.018	-2.98	***
Age 35-44	0.014	2.18	**	-0.005	-0.93	
Age 45-54	0.016	2.49	**	-0.002	-0.32	
Age 55-64	0.008	1.39		-0.014	-2.91	***
Low educated	0.008	1.75	*	0.045	10.08	***
Middle educated	-0.017	-4.19	***	-0.002	-0.79	
Single	0.016	4.25	***	0.017	5.59	***
No longer married	0.028	5.02	***	0.021	5.25	***
Part time worker	-0.012	-2.33	**	0.006	1.3	
Unemployed	0.049	7.01	***	0.069	11.57	***
Student	0.006	0.53		0.015	1.45	
Retired	0.033	5.87	***	0.019	3.84	***
Housewife,-man	-0.003	-0.48		-0.004	-0.67	
Disable	0.082	5.75	***	0.071	7.96	***
Other inactive	0.007	0.6		0.004	0.43	
Profession low skill	0.024	4.31	***	0.01	1.94	*
Profession medium skill	-0.018	-4.44	***	-0.017	-5.3	***
Constant	0.12	17.09	***	0.102	17.97	***
Obs.	14,744			14,121		
R2	0.03			0.05		

Notes: * stands for statistically different from zero at 10%, **at 5%, *** at 1%.

Source: own calculation on weighted data from ISSP.

Table 4.3: RIF Regressions for the two periods, for Gini

	1992			2009		
	Coeff.	t		Coeff.	t	
Female	0.008	2.66	***	0.006	2.09	**
Age 16-24	0.01	1.26		-0.004	-0.54	
Age 25-34	0.014	2.16	**	0.002	0.3	
Age 35-44	0.023	3.48	***	0.015	2.47	**
Age 45-54	0.02	3.08	***	0.017	2.85	***
Age 55-64	0.016	2.65	***	-0.003	-0.69	
Low educated	0.038	7.91	***	0.081	17.15	***
Middle educated	0.002	0.4		0.015	4.6	***
Single	0.012	3.24	***	0.024	7.5	***
No longer married	0.037	6.61	***	0.031	7.28	***
Part time worker	-0.018	-3.42	***	0.008	1.62	
Unemployed	0.07	9.78	***	0.097	15.42	***
Student	-0.018	-1.62		0.002	0.2	
Retired	0.048	8.28	***	0.042	8.02	***
Housewife,-man	-0.016	-2.41	**	-0.003	-0.49	
Disable	0.112	7.63	***	0.113	12.12	***
Other inactive	0.004	0.32		0.019	1.96	*
Profession low skill	0.067	11.7	***	0.04	7.31	***
Profession medium skill	0.012	3	***	0	0.14	
Constant	0.135	18.77	***	0.12	20.05	***
Obs.	14,744			14,121		
R2	0.06			0.09		

Notes: * stands for statistically different from zero at 10%, **at 5%, *** at 1%.

Source: own calculation on weighted data from ISSP.

What emerges is that the main determinants of self perceived social position inequality are connected with occupational status and type of profession.

Considering the variance, some age classes have a significant and positive impact on the dependent variable in 1992, but the opposite is observable in 2009 when being older is associated with a higher dispersion of the answers. The effect of low education increased with time since the association between this covariate, which increases the dispersion of the variance, and our measure of inequality is higher in 2009 than in 1992. An opposite relationship appears for middle education, with respect to high education, that has a negative impact on the variance which is significant only in the first year.

Being single and no longer married (widowed, separated or divorced) has a significant and positive effect regardless the period considered. Looking at the occupational status, it is well worth noting that having a part-time job is related to a lower variance in 1992 but an inverse relationship is observable in the second year. Unemployment has a positive and significant impact that becomes more evident in 2009: the mean values of the declared categories by unemployed are very low (4.31 in 1992 and 4.29 in 2009) but the results of the regressions show a great dispersion from these scores and a strong influence on the total variance registered. Similarly, the disability status significantly increases the subjective social position inequality, while the effects of being a student, housewife and other inactive are never significant looking at the variance. Furthermore, the effect of being retired is positive and decreases over time. Finally, the estimated RIF-coefficients associated with professional skills are statistically different from zero. On the one hand, having a profession where low skills are required increases the variance, even though the effect is lower in 2009. On the other hand, medium skill professions decrease the inequality with a constant effect over time.

Looking at the results using the Gini index the majority of the evidences emerged from the analysis of the variance are confirmed since the coefficient that are significant in both analysis have always the same sign and similar magnitude, given the different scale between the two inequality indices. The differences between the two models regard the statistical significance of some coefficients. In some of these cases, where just one of the two coefficients is statistically different from zero, opposite signs of the value are observable.

4.5.2 Decomposition results

The observed changes in the distribution of the subjective social position inequality over the last 17 years are decomposed in a composition effect due to differences in observable covariates across population, and a structure effect due to differences in the relationship that links the covariates to the outcome.

The results of the decomposition analysis of the variance and the Gini index are presented in table 4.4.

To simplify the presentation of the results, the table reports the composition effect for five sets of explanatory factors: gender, age, education, occupational status and profession. Both composition effect and coefficient effect have contributed to the change in the distribution of the categories declared by people concerning their location across a social scale between 1992 and 2009, but in an opposite sense.

Considering the impact on the change of variance², the composition effect positively influences the variation of the inequality, while the coefficient effect has a much stronger and negative impact.

This means that if the distribution of the covariates across population had re-

²The unadjusted change is -0.19 and not -0.30 because the means in both distribution are imposed to be equal to 1 to avoid problems connected with the dependency of the variance on the mean.

Table 4.4: Inequality changes: FFL decomposition results, composition and coefficient effect for variance and Gini index

Inequality measure	Variance			Gini		
Unadjusted change	-0.0199	(0.0019)	***	-0.0166	(0.002)	***
Composition effect						
attributable to						
Gender	0	(0.0001)		0.0002	(0.0001)	**
Age	-0.0004	(0.0005)		-0.001	(0.0005)	*
Education	-0.0016	(0.0007)	**	-0.0059	(0.0007)	***
Occupational status	0.0066	(0.0007)	***	0.0085	(0.0008)	***
Profession	0	(0.0003)		-0.0018	(0.0003)	***
Total explained	0.0046	(0.0011)	***	-0.0001	(0.0011)	
Coefficient effect						
attributable to						
Gender	0.0035	(0.0021)	*	0.0011	(0.0021)	
Age	-0.0115	(0.0058)	**	-0.0096	(0.0059)	*
Education	0.008	(0.0031)	***	0.0073	(0.0031)	**
Occupational status	-0.0013	(0.0028)		0.0062	(0.0029)	**
Profession	-0.0024	(0.0038)		-0.0099	(0.0038)	***
Constant	-0.0214	(0.0083)	***	-0.011	(0.0085)	
Total unexplained	-0.025	(0.0019)	***	-0.0159	(0.0019)	***

Notes: * stands for statistically different from zero at 10%, **at 5%, *** at 1%.

Standard errors are in parentheses.

Source: own calculation on weighted data from ISSP.

mained constant over time, the variance would have decreased to a greater extent.

Looking at the composition effect, the decreased percentage of people with a low education in 2009 (from 31% in 1992 to 15.4% in 2009) reduced the change of the variance by 7.9% of the total variance variation observed. On the contrary, the composition effect is positive and strong in the case of occupational status, since the increase in the shares of unemployed, retired and disable (table 4.1) is multiplied by a positive coefficient as it is observable looking at the results of the RIF regressions (tables 4.2 and 4.3).

Interesting evidences emerge from the analysis of the coefficient effect: as previously noticed the total impact is negative and the results indicate that -0.0214 of the -0.0250 decline in the variance variation due to this effect remains unexplained since it is given by the effect of the “constant” in table 4.1. As defined in Fortin, Lemieux and Firpo (2011), in fact, the change in intercepts represents the change in the distribution for the base group used in the RIF-regression analysis. Then that component of the decomposition can be interpreted as the residual (or within-group) change for the base group. Also the resulting effect of age accounts in large part to the negative structure effect while the impacts of profession and occupational status contribute in the same direction but are smaller and not significant. On the contrary, education and gender have a positive impact in the change of the variance over this period (0.0080) but these effects are quite small.

Looking at the FFL decomposition results for the Gini index, the composition effect is very little and not significant overall. The signs of the coefficient effects are confirmed, excepting the occupational status variables that in this case have a positive and significant effect. The influence of the constant is the highest observed if compared with the other values but it is not significant in this analysis.

4.6 Conclusion

This Chapter introduced the consideration of self perception in the analysis of the middle class.

It contributes to investigate the perceptions of individuals of their position in society, merging data of 14 countries from the International Social Survey Program (ISSP), to explore the inequality between people's self location and its overtime changes.

The methodological approach proposed by Fortin, Lemieux and Firpo (2011) has been applied to the years 1992 and 2009: the first analysis explored which the main drivers are of the inequalities of people's perceptions of their position in society and, the second analysis inquired into what extent the changes in the distributions, broken up into a composition and a coefficient effects, depend on individual characteristics.

What emerges from both these steps is an interesting pattern. Firstly, the main determinants of subjective social position inequality are connected with occupational status and type of profession but also education plays a significant role, especially in the second period considered. Secondly, the changes of the distribution of the covariates across population would have increased the subjective social position inequality but this effect is completely compensated by the coefficient effect. The consequence is a decline in the inequality between the two years that remains in great part unexplained since it is mainly given by the effect of the constant. These results can give us some information on the evolution of people's perception of society.

Indeed, this evidence is coherent with the "reference-groups hypothesis" that images a society more stable over years where people tend to locate themselves at the middle, regardless of their individual characteristics like the level of education, the profession and the occupational status, and despite the increasing inequalities which are observable within countries (OECD, 2011).

Authors such as Frank (2007), Layard (2005), and Graham (2007) connected this attitude to the increasing role played by the relative social context in forming people's aspirations and their consciousness of quality of life.

Thus, results are consistent with what was pointed out by Evans and Kelley (2004) according to which:

“a person's subjective social location partly reflects reference group forces drawing everyone towards the centre, and partly reflects actual social inequalities. [...] Reference group forces do seem to push everyone's perceptions towards the middle. But at the same time, social stratification pulls them apart, so that reference group forces mitigate rather than obliterate the subjective impact of social inequalities” (Evans and Kelley, 2004, p. 29).

Indeed, according to this evidence some negative implications are possible.

In particular, the progressive shirking and impoverishment of the middle class may have even more deep effects in terms of life satisfaction and well-being.

Furthermore, these findings may be related to a society within which trust and expectations of personal and country's situation do not differ according to the various classes of income, leading to emulative behaviours across the whole country (Golinelli and Parigi, 2004; Boeri and Brandolini, 2005; Levine, Frank and Dijk, 2010).

Conclusions

The review of the theoretical and empirical literature and the empirical analyses put forward in this thesis provided some answers to the research questions set in the introduction, pointing out the limits of the analyses of the middle class in economics carried out so far.

On the one hand, we argued that most studies only consider relative definitions of middle class and tend to identify the middle class through a specific stratum of the income distribution without basing this identification on sound theoretical assumptions. On the other hand, we showed that - even if considering a single quantitative characteristic, i.e. income, as to distinguish who belongs to the middle class - the economic literature does not provide an agreed criterion on how to define the middle class. As a consequence, various approaches have been followed, leading to different findings as concerns both the share of the population belonging to the middle class and the share of total income got by such class.

In this context, the increasing attention devoted to the role that the middle class can play as to make society more solid and the increasing interest in the public debate to what is happening to the middle groups raise the necessity to provide an unambiguous framework to analyse middle class.

As pointed out also by the sociological literature, also dimensions other than income should be investigated for a comprehensive analysis of the middle class. In particular, a careful attention should be devoted, on the one hand, to assess subjective perceptions of individual positions across society and, on the other hand, to

observe the mobility across different time periods of those belonging to the middle class. Indeed, a person's sense of self may not coincide completely with objective reality as it depends on personal capabilities, interpersonal relations, financial and material assets, and perceptions of economic insecurity (Lora and Fayardo, 2011). Furthermore, also due to data limitations, economic analyses study the middle class in a given year, without inquiring, in a dynamic perspective, the mobility of the middle class members. However, mobility could significantly affect people's behaviour, choices and well-being. Indeed, economic security, defined as the ability to maintain an appropriate consumption's profile and to face income's fluctuations, is considered a fundamental attribute of the middle class: exploring the relationship between mobility and class dynamics can be crucial for a more complete understanding of the middle class well-being (Torche and López-Calva, 2013).

The four chapters of this thesis aim to deepen the knowledge of the middle class providing an answer to some of the aforementioned issues. In more details the main findings of the thesis are the following.

Chapter 1 expanded the conceptual and theoretical repertoires in the study of middle class groups in economics considering the insights of the evolving research field on polarization, a related phenomenon which has been theoretically defined, conceptualised and explored by a significant number of authors and concerns the disappearance of the middle class (e.g. Foster and Wolfson, 1992; Esteban and Ray, 1994; Duclos, Esteban and Ray, 2004; Handcock and Morris, 1998, 1999).

Polarization measures aim to explore whether it is possible to observe “the appearance of groups in a distribution” (Chakravarty, 2009) and to capture the gap between those at the top and those at the bottom of a society. It can also be regarded as a “clustering” of the population around two or more poles of the income distribution, which might give rise to social conflicts and tensions (Esteban and Ray,

1999, 2008, 2011). For these reasons, the techniques developed to investigate polarization enable to capture the information contained in the distribution of income, stating unambiguously if middle class increased or decreased over time. Hence, these studies can be applied to identify the relative position of middle groups and observe its changes over time.

Following the polarization theoretical and empirical framework, using the Italian Survey on Household Income and Wealth (SHIW) of the Bank of Italy dataset, Chapter 2 provided empirical evidences on the Italian middle class using different methodological tools and investigating its underlying structure and the evolution over the last two decades up until to the current recession phase.

The main purpose of the Chapter was, then, to provide an unified setting for outlining the effects of the changes of the Italian income distribution on the middle class. Our analysis was mainly based on the studies by Foster and Wolfson (1992) and Handcock and Morris (1998, 1999). Using various polarization indices our findings show a gradual decrease of polarization between 1998 and 2006, while the opposite emerges in the period 2006-2012. Furthermore, the income distribution in 2006 is characterised by a larger and more cohesive middle class than the income distribution in 2012. Estimating the effects due to changes in the shape of the income distribution from those due to changes in the location of the income distribution, we find that it emerges that the shape effect would have significantly increased the number of individuals in the upper and lower deciles. Furthermore, distinguishing population subgroups by household heads' characteristics, the highest value of polarization emerges among those households headed by a self-employed and high values - consistent with an increasing polarization between 2006 and 2012 - also concern households whose head was less than 41 year old. Considering the role of individual characteristics in attracting people at the top or at the bottom of the income distri-

bution, education turns out to create and reproduce distinguishable social categories and, additionally, the spatial polarization of the Italian society comes out, as the low income earners tend to live in the south regions.

Finally, we proposed to identify middle class members in Italy using non-parametric kernel density procedures, following Esteban, Gradín and Ray (2007). Via the calculus of the optimal income boundaries that separate each group from the others, a general impoverishment of the middle income group emerged coupled with a substantial stability over time of the characteristics of the middle class, as evident looking at summary statistics.

Over the characteristics of the middle class in a certain year, it is crucial to observe the mobility of middle class members, an issue usually overlooked by the empirical studies. Chapter 3 aims to investigate the drivers of mobility of the middle class in Italy and assessing the changes of middle class members vulnerability during the beginning current recession phase. To this aim, we used the longitudinal component of the SHIW dataset and clustered individuals in three groups (low, middle and high class) according to income thresholds obtained following the method proposed by Esteban, Gradín, and Ray (2007). The findings reveal a general impoverishment of the middle class due to the economic recession and show an increasing rigidity of the Italian social structure, because lower entry and exit rates between classes emerges after 2008.

Furthermore, through a multinomial logit regression, we studied the association between downward or upward movements of middle class members and their characteristics, also focusing on the role played by some demographic and economic events affecting individuals and households in the observed time period (i.e. changes in household composition and employment statuses). Comparing regressions' results for the periods 2002-2006 and 2008-2012, different probabilities to move characterise

the various groups of individuals and, mostly, the association between the occurrence of positive and negative trigger events and individual mobility strengthens in 2008-2012, maybe due to the growing weakness of the welfare state and the increasing inability of the families to cope with the difficulties.

Finally, Chapter 4 included the subjective dimension in the analysis of the middle class. The literature has widely examined the relations between a number of factors, at both micro and macro level, and people's opinions on their location in society (Hodge and Treiman, 1968; Jackman and Jackman, 1973; and Singelmann, 1982). We extend this stream of research focusing on the inequality in people's self-declared position in society. Drawing data from the International Social Survey Program (ISSP) for fourteen countries, we proposed an evaluation of the association between several covariates and people's judgment of their relative social position, focusing on answers' heterogeneity and inquiring whether some individual features affect the subjective perception of individual social position. Through a two steps analysis on the 1992 and 2009 waves of the ISSP, we find that the role played by some individual characteristics as age, education, employment status and occupation in explaining the heterogeneity of people's answers declined in 2009 when compared to 1992 and the decomposition method proposed by Firpo, Fortin and Lemieux (2011) reveals that this decline is not due to changes in the characteristics of the ISSP samples.

Our findings are then consistent with the suggestions by Evans and Kelley (2004) who argue that everyone's perceptions are converging towards the middle, regardless of the individual characteristics and the increasing income disparities within countries (OECD, 2011).

In conclusion, the main goal of this thesis was to provide an integrated framework to analyse middle class in economics, focusing on polarization analyses and taking into account the often neglected aspects of individual mobility over time and self-

perception. A neglected topic, that we aim to inquire in future researches, concerns the consequences of changes of middle class' size and features on the outcomes of the economic systems.

Anyhow, the insights derived from the integrated approach followed in this thesis point out that economic analysis of the middle class should take into account various dimensions. Hence, future research in this direction should be encouraged.

References

- Addabbo T. (2000), Poverty Dynamics: Analysis of Household Incomes in Italy, in *Labour*, 14(1), 119-144.
- Adelman I. and Morris C.T. (1967), Society, Politics and Economic Development- A Quantitative Approach, Baltimore, Johns Hopkins Press.
- Akerlof G. and Kranton R. (2000), Economics and identity, in *The Quarterly Journal of Economics*, 115(3), 715-753.
- Albornoz F. and Menéndez M. (2007), Income Dynamics in Argentina During the 1990's: "Mobiles" do Change with Type of Macroeconomic Shock, in *Economics Papers University Paris Dauphine*, Paris Dauphine University.
- Alderson A. and Doran K. (2013), How has income inequality grown? The reshaping of the income distribution in LIS countries in Gornick J. and Jäntti M. (edited by), *Income Inequality Economic Disparities and the Middle Class in Affluent Countries*, Stanford University Press, Stanford CA.
- Alesina A. and Perotti R. (1996), Income Distribution, Political Instability and Investment, in *European Economic Review*, 40(6), 1203-28.
- Allison R.A. and J. Foster (2004), Measuring Health Inequalities Using Qualitative Data, in *Journal of Health Economics*, 23, 505-524.
- Andersen R. and Curtis J. (2012), The polarizing effect of economic inequality on class identification: Evidence from 44 countries, in *Research in Social Stratification*

- and Mobility*, 30(1), 129-141.
- Anderson G. (2004), Towards an Empirical Analysis of polarization, in *Journal of Econometrics*, 122, 1-26.
- Apouey B. (2007), Measuring health polarization with self-assessed health data, in *Health Economics*, Special Issue: Workshop Edition, 16(9), 875-894.
- Araar A. (2008), On the Decomposition of polarization Indices: Illustrations with Chinese and Nigerian Household Surveys, *Cahiers de recherche* 0806, CIRPEE.
- Aristotle (c. 350 BC) (1932), *Politics*, Translated by Rackham H., Harvard University Press, Cambridge, MA.
- Atkinson A. and Brandolini A. (2013), On the identification of the middle class, in Gornick J. and Jäntti M. (edited by), *Income Inequality Economic Disparities and the Middle Class in Affluent Countries*, Stanford University Press, Stanford CA.
- Autor D., Katz L. and Kearney M. (2006), The polarization of the U.S. labor market, in *American Economic Review Papers and Proceedings*, 96(2), 189 - 194.
- Bagnasco A. (2004), *Quasi poveri e vulnerabili*, Il Mulino, 53(412), 278-289.
- Bagnasco A. (2005), The question of the middle class, in Guarnieri C. and Newell J. (edited by), *Italian Politics. Quo Vadis?*, Berghahn Books, New York and Oxford.
- Bagnasco A. (2008), *Ceto medio, perché e come occuparsene*, Il Mulino, Bologna.
- Bane M.J. and Ellwood D.T. (1986), Slipping into and out of Poverty: the Dynamics of Spells, in *Journal of Human Resources*, 21(1), 1-23.

- Banerjee A.V. and Duflo E. (2008), What is middle class about the middle classes around the world?, in *The Journal Of Economic Perspectives: A Journal Of The American Economic Association*, 22(2), 3-28.
- Barro R.J. (1999), Determinants of Democracy, in *Journal of Political Economy*, 107(S6), S158-S183.
- Beach C., Chaykowski R. and Slotsve G. (1997), Inequality and polarization of male earnings in the United States, 1968-1990, in *North American Journal of Economics and Finance*, 8, 135-152.
- Becchetti L., Massari R. and Naticchioni P. (2013), The Drivers of Happiness Inequality: Suggestions for Promoting Social Cohesion, in *Oxford Economic Papers* first published online May 3.
- Berthoud R. and Böheim R. (1998), *Predicting Problem Debt*, Institute for Social and Economic Research, University of Essex, Report to Barclay's Bank Ltd.
- Bhattacharya N. and Mahalanobis B. (1967), Regional disparity in household consumption In India, in *Journal of American Statistical Association*, 62, 143-161.
- Birdsall N. (2010), The (Indispensable) Middle Class in Developing Countries; or, The Rich and the Rest, Not the Poor and the Rest, Working Paper N. 207, Center for Global Development, Washington, DC and London.
- Birdsall N., Graham C. and Pettinato S. (2000), Stuck In The Tunnel: Is Globalization Muddling The Middle Class?, Center on Social and Economic Dynamics, Working Paper N. 14, Brookings Institution, Washington, DC.
- Blackburn M. and Bloom D. (1985), What is Happening to the Middle Class?, in *American Demographics*, 7(1), 19-25.

- Boeri T. and Brandolini A. (2004), The Age of Discontent: Italian Households at the Beginning of the Decade, in *Giornale degli Economisti e Annali di Economia*, 63, 155-193.
- Borraz F., González Pampillón N. and Rossi M. (2013), Polarization and the Middle Class in Uruguay, in *Latin American Journal of Economics* (formerly Cuadernos de Economía), Instituto de Economía, Pontificia Universidad Católica de Chile, 50(2), 289-326.
- Bourdieu P. (1984), *Distinction: A Social Critique of the Judgement of Taste*, Harvard University Press, Cambridge, MA.
- Bourdieu P. (1987), What Makes a Social Class?, in *Berkeley Journal of Sociology*, 22, 1-18.
- Bradshaw J., Kemp P., Baldwin S. and Rowe A. (2004), The Drivers of Social Exclusion: A review of the literature, Breaking the Cycles Series, Social Exclusion Unit, Office of the Deputy Prime Minister, London.
- Brandolini A. (2000), Appunti per una storia della distribuzione del reddito in Italia nel secondo dopoguerra, in *Rivista di storia economica*, 2, 213-232.
- Cameron C. and Trivedi P. (2010), *Microeconometric using Stata*, Stata Corp, College Station, Texas.
- Carbone D. and Ceravolo F. (2012), Crisi economica e diseguaglianze sociali. La situazione italiana nello scenario, contributo in Atti di convegno, Cosenza.
- Chakravarty S. (2009), *Inequality, Polarization and Poverty: Advances in Distributional Analysis*, Springer, New York.

- Chakravarty S. and D'Ambrosio C. (2010), Polarization Orderings of Income Distributions, in *Review of Income and Wealth*, 56, 47-64.
- Chakravarty S. and Majumder A. (2001), Inequality, Polarization and Welfare: Theory and Applications, in *Australian Economic Papers*, 40(1), 1-13.
- Chauvel L. (2013), Welfare Regimes, Cohorts and the Middle Classes, in Gornick J.C. and Jäntti M. (edited by), *Income Inequality, Economic Disparities and the Middle Class in Affluent Countries*, Stanford University Press, Stanford CA.
- Cleveland W.S. (1979), Robust locally weighted regression and smoothing scatterplots, in *Journal of the American Statistical Association*, 74, 829-836.
- Corsi M, D'Ippoliti C. (2013), Class and gender in Europe, before and during the economic crisis, Working Papers, n. CEB 13-027, ULB - Université Libre de Bruxelles.
- Cruces G., López Calva L., and Battistón D. (2011), Down and Out or Up and In? Polarization-Based Measures of the Middle Class for Latin America, in *CEDLAS Working Paper*, 113, Universidad Nacional de la Plata, Centro de Estudios Distributivos, Laborales y Sociales (CEDLAS).
- Cwik J. and Mielniczuk J. (1989), Estimating Density Ratio with Application to Discriminant Analysis, in *Comm. Statist. Theory Methods*, 18, 3057-3069.
- D'Ambrosio C. (2001), Household Characteristics and the Distribution of Income in Italy: an Application of Social Distance Measures, in *Review of Income and Wealth*, 47, 43-64.
- D'Ambrosio C., Muliere P. and Secchi P. (2003), Income Thresholds and Income Classes, in *DIW Berlin discussion paper*.

- D'Ambrosio C. and Permanyer I. (2014), Measuring Social Polarization with Ordinal and Categorical Data, forthcoming in *The Journal Of Public Economic Theory*.
- Deininger K. and Squire L. (1996), A New Data Set Measuring Income Inequality, in *The World Bank Economic Review*, 10(3), 565-91.
- Di Tella R. and McCulloch R. (2006), Some uses of happiness moderation, Discussion Paper n. 6761, in *Journal of Economic Perspectives*, 20, 25-46.
- Di Vico D. and Fittipaldi E. (2004), *Profondo Italia*, BUR Biblioteca Univ. Rizzoli, Milano.
- Diener E., Suh E., Lucas R. and Smith H.L. (1999), Subjective WellBeing: Three Decades of Progress, in *Psychological Bulletin*, 125(2), 276-302.
- DiNardo J., Fortin N.M. and Lemieux T. (1996), Labour market institution and the distributions of wage, 1973-1992: a semiparametric approach, in *Econometrica*, 64, 1001-1044.
- Duclos J., Esteban J.M. and Ray D. (2004), Polarization: concepts, measurement, estimation, in *Econometrica*, 72(6), 1737-1772.
- Durkheim E. (1933), *The Division of Labour in Society*, Free Press, Glencore IL.
- Easterly W. (2001), The Middle Class Consensus and Economic Development, in *Journal of Economic Growth*, Springer, 6(4), 317-35.
- Erikson R. and Goldthorpe J.H. (1992), *The Constant Flux: A Study of Class Mobility in Industrial Societies*, Clarendon Press, Oxford.
- Erikson R., Goldthorpe J.H., Jackson M., Yaish M. and Cox D.R. (2005), On Class Differential in Educational Attainment, in *Proceedings of the National Academy of Sciences of the United States of America*, 102(27), 9730-9733.

- Erikson R., Goldthorpe J.H. and Portocarrero L. (1979), Intergenerational class mobility in three Western European societies: England, France and Sweden, in *British Journal of Sociology*, 30, 415-441.
- Estache A. and Leipziger D. (2009), Stuck in the Middle: Is Fiscal Policy Failing the Middle Class?, in *ULB Institutional Repository*, 2013/44102, ULB - Universite Libre de Bruxelles.
- Esteban J.M. (2002), Economic Polarization in the Mediterranean Basin, in *Centre de Ricerca En Economia Internacional*, 119, 128.
- Esteban J.M., Gradín C. and Ray D. (2007), An extension of a measure of polarization, with an application to the income distribution of five OECD countries, in *The Journal of Economic Inequality*, 5(1), 1-19.
- Esteban J.M. and Ray D. (1994), On the Measurement of Polarization, in *Econometrica*, 62(4), 819-51.
- Esteban J.M. and Ray D. (2007), A comparison of polarization measures, in *UFAE and IAE Working Papers*, Unitat de Fonaments de l'Anàlisi Econòmica (UAB) and Institut d'Anàlisi Econòmica (CSIC), 127.
- Esteban J.M. and Ray D. (2012), Comparing polarization measures, in Garfinkel M. and Skaperdas S. (edited by), *The Oxford Handbook of the Economics of Peace and Conflict*, Oxford University Press, Oxford.
- Evans M.D.R. and Kelley J. (2004), Subjective Social Location: Data From 21 Nations, in *International Journal of Public Opinion Research*, 16(1), 3-38.
- Ferreira F.H., Messina J., Rigolini J., López-Calva L., Lugo M.A. and Vakis R. (2012), *Economic Mobility and the Middle Class: Concepts and Measurement in*

- Economic Mobility and the Rise of the Latin American Middle Class*, Word Bank, Washington.
- Fields G.S. (2008). Income mobility in Blume L. and Durlauf S. (edited by), *The new Palgrave dictionary of economics*, Palgrave Macmillan, New York.
- Fields G.S., Leary G.J. and Ok E.A. (2002), Stochastic dominance in mobility analysis, in *Economics Letters*, 75 (3), 333–339.
- Fields G.S. and Ok E.A. (1996), The meaning and measurement of income mobility, in *Journal of Economic Theory*, 71 (2), 349–377.
- Firpo S., Fortin N. and Lemieux T. (2009), Unconditional Quantile Regressions, in *Econometrica*, 77 (3), 953–973.
- Fortin N., Lemieux T. and Firpo S. (2011), Decomposition methods in economics, in Ashenfelter O., Card D. (edited by), *Handbook of Labor Economics 4A*, North Holland, Amsterdam.
- Foster J.E. and Shorrocks A.F. (1988), Poverty Orderings and Welfare Dominance, in *Social Choice and Welfare*, 5, 179–198.
- Foster J.E. and Wolfson M.C. (1992) [2009], Polarization and the Decline of the Middle Class: Canada and the U.S., in *The Journal of Economic Inequality*, 8(2), 247–273.
- Frank R.H. (2007), *Falling Behind. How Rising Inequality Harms the Middle Class*, University of California Press, Berkeley.
- Franzini M. (2010), *Ricchi e poveri. L'Italia e le disuguaglianze (in)accettabili*, Università Bocconi, Milano.

- Frey B.S. and Stutzer A. (2002), The Economics of Happiness, in *World Economics*, 3(1).
- Frick J.M. and Grabka M.M. (2013), Public pension entitlements and the distribution of wealth, in Gornick J. and Jäntti M. (edited by), *Income Inequality Economic Disparities and the Middle Class in Affluent Countries*, Stanford University Press, Stanford CA.
- Friedman M. (1962), *Capitalism and freedom*, University of Chicago press, Chicago.
- Ganzeboom H.B., De Graaf P.M. and Treiman D.J. (1992), A Standard International Socio-Economic Index of Occupational Status, in *Social Science Research*, 21, 1-56.
- Garcia-Montalvo J.C. and Reynal-Querol M. (2005), Ethnic polarization, potential conflict and civil war, in *American Economic Review*, 95(3), 796-816.
- Giddens A. (1973), *The Class Structure of the Advanced Societies*, Hutchinson, London.
- Goldthorpe J.H. (1980), *Social Mobility and Class Structure in Modern Britain*, Clarendon Press, Oxford.
- Goldthorpe J.H. and McKnight A. (2004), The Economic Basis of Social Class, *CASEpaper*, 80, London School of Economics.
- Golinelli R. and Parigi G. (2004), Consumer sentiment and economic activity: a cross country comparison, in *Journal of Business Cycle Measurement and Analysis*, 1(2), 147-172.
- Goos M. and Manning A. (2007), Lousy and Lovely Jobs: The Rising Polarization of Work in Britain, in *The Review of Economics and Statistics*, MIT Press, 89(1), 118-133.

- Goos M., Manning A. and Salomons A. (2009), Job Polarization in Europe, in *American Economic Review*, 99(2), 58-63.
- Graham C. (2007), What Happiness Research Can (and Cannot) Contribute to Policy Reforms: Lessons from Research on Latin America and Beyond, draft presented at the World Bank Workshop Fiscal Incidence and the Middle Class: Implications for Policy, June 5.
- Gutierrez R., Linhart J.M., Pitblado J. (2003), From the help desk: Local polynomial regression and Stata plugins, in *The Stata Journal*, 3(4), 412-419.
- Hacker J. (2006), *The great risk shift. The assault on American jobs, families, health care and retirement. And how you can fight back*, Oxford University Press, New York.
- Hampel F.R. (1974), The influence curve and its role in robust estimation, in *Journal of the American Statistical Association*, 69, 383-393.
- Handcock M. and Aldrich E. (2002), Applying Relative Distribution Methods in R, Working Paper N. 27, University of Washington.
- Handcock M. and Morris M. (1998), *Relative distribution methods in the social science*, Springer, New York.
- Handcock M. and Morris M. (1999), Relative Distribution Methods, in *Sociological Methodology*, 28, 53-97.
- Hodge R.W. and Treiman D.J. (1968), Class Identification in the United States, in *American Journal of Sociology*, 73(5), 535-547.
- Horrigan, M.W. and Haugen S.E. (1988), The declining middle-class thesis: A sensitivity analysis, in *Monthly Labor Review*, 111, 3-13.

- Hout M. (2004), How inequality may affect intergenerational mobility in Neckerman K. (edited by), *Social Inequality*, Russell Sage, New York.
- Jackman M.R. and Jackman R. (1973), An Interpretation of the Relation between Objective and Subjective Social Status, in *American Sociological Review*, 38, 569-582.
- Jäntti M. and Jenkins S. (2013), Income Mobility, in Atkinson A. and Bourguignon F. (edited by), *Handbook of Income Distribution*, 2, Elsevier-North Holland.
- Jencks C. and Tach L. (2006) Would Equal Opportunity Mean More Mobility in Morgan S., Grusky D. and Fields G. (edited by), *Mobility and Inequality*, Stanford University Press, Stanford.
- Jenkins S. (1995), Did the Middle Class Shrink During the 1980s? UK Evidence From Kernel Density Estimates, in *Economics Letters*, 49(4), 407–413.
- Jenkins S. (2011), *Changing Fortunes: Income Mobility and Poverty Dynamics in Britain*, Oxford University Press, Oxford.
- Jenkins S. and Schluter C. (2003), Why are child poverty rates higher in Britain than in Germany?: A longitudinal perspective, in *Journal of Human Resources*, 38(2), University of Wisconsin Press.
- Jenkins S. and Van Kerm P. (2006), Trends in income inequality, pro-poor income growth, and income mobility, in *Oxford Economic Papers*, 58(3), 531-548.
- Jenkins S. and Van Kerm P. (2008), Has income growth in Britain become more pro-poor?, presented at the 30th General Conference of The International Association for Research in Income and Wealth, Portoroz, Slovenia, August 24-30.

- Jenkins S. and Van Kerm P. (2011), Trends in individual income growth: measurement methods and British evidence, *CEPS/INSTEAD Working Paper Series*, 21, CEPS/INSTEAD.
- Josten S.D. (2005), Middle-Class Consensus, Social Capital and the Mechanics of Economic Development, *Discussion Paper 36*, Helmut-Schmidt University Economics Department.
- Kahneman D. and Krueger A.B. (2006), Developments in the Measurement of Subjective Well-Being, in *The Journal of Economic Perspectives*, 20(1), 3-24.
- Kahneman D., Slovic P. and Tversky A. (1982), Judgment Under Uncertainty: Heuristics and Biases, Cambridge University Press, New York.
- Kelley H.H. (1967), Attribution Theory in Social Psychology Nebraska, in *Symposium on Motivation*, 15, 192-238.
- Kelley J. and Evans M.D. (1995), Class and Class Conflict in Six Western Nations, in *American Sociological Review*, 60(2), 157-178.
- Kharas H. and Gertz G. (2010), The New Global Middle Class: A Cross-Over from West to East, in Li C. (edited by), *China's Emerging Middle Class: Beyond Economic Transformation*, Brookings Institution Press, Washington DC.
- Kobus M. (2013), On the measurement of inequality for ordinal data, paper presented at the Fifth meeting of the Society for the Study of Economic Inequality (ECINEQ), Bari.
- Kristjánsson A.S. and Ólafsson S. (2013), Income Inequality in Boom and Bust: a Tale from Iceland's Bubble Economy, in Gornick J. and Jäntti M. (edited by), *In-*

- come *Inequality Economic Disparities and the Middle Class in Affluent Countries*, Stanford University Press, Stanford CA.
- Krugman P. (2014), *Redefining the Middle Class*, 14 February 2014, <http://truth-out.org/>
- Landes D. (1998), *The Wealth and Poverty of Nations*, Norton, New York NY.
- Lasso de la Vega C. and Urrutia A.M. (2006), An alternative formulation of Esteban-Gradín-Ray extended measure of polarization, in *Journal of Income Distribution*, 15, 42-54.
- Layard R. (2005), *Happiness: Lessons from a New Science*, Penguin Press, New York.
- Leatherman J., DeMars W., Gaffney P.D. and Vayrynen R. (1999), *Breaking the Cycles of Violence: Conflict Prevention in Intrastate Crises*, Kumarian Press, West Hartford.
- Levine A.S., Frank R.H. and Dijk O. (2010), *Expenditure Cascades*, available at SSRN: <http://ssrn.com/abstract=1690612>.
- Levy F. (1987), The Middle Class: Is It Really Vanishing?, in *The Brookings Review*, Summer, 17-21.
- Lieberson S. (1969), Measuring Population Diversity, in *American Sociological Review*, 34, 850-862.
- Lindemann K. (2007), The Impact of Objective Characteristics on Subjective Social Position, in *Trames*, 11, 54-68.
- Littrell J., Brooks F, Ivery J. and Ohmer M. (2010), Why you should care about the threatened middle class, in *Journal of Sociology & Social Welfare*, 37(2), 85-112.

- López-Calva L. and Ortiz-Juarez E. (2014), A vulnerability approach to the definition of the middle class, in *Journal of Economic Inequality*, Springer, 12(1), 23-47.
- Lora E.A. and Fajardo A.G. (2011), Latin American Middle Classes: The Distance between Perception and Reality, *IDB Working Paper*, N. IDB-WP-275.
- Marx K. (1844) [1972], Economic and Philosophic Manuscripts of 1844: Selections, Trans Martin Milligan, in Tucker R. (edited by), *The Marx-Engels Reader*, W.W. Norton, New York.
- Marx K. and Engels F. (1968), The Communist Manifesto, in *Selected Works*, International Publishers, New York.
- Massari M., Pittau M. and Zelli R. (2009), A Dwindling Middle Class? Italian Evidence in the 2000s, in *Journal of Economic Inequality*, Springer 7(4), 333-350.
- Milanovic B. and Yitzhaki S. (2002), Decomposing World Income Distribution: Does The World Have A Middle Class?, in *Review of Income and Wealth*, 48(2), 155-178.
- Morduch J. (1994), Poverty and Vulnerability, in *The American Economic Review*, 84(2).
- Morrison K. (2006), *Marx, Durkheim, Weber: Formations of Modern Social Thought*, Sage, London.
- Murphy K., Schleifer A. and Vishny R. (1989), Industrialization and the Big Push, in *Journal of Political Economy*, 97(5), 1003-1026.
- Nadaraya E.A. (1964), On estimating regression, in *Theory of probability and its application*, 9, 141-142.
- OECD (2011), *Divided We Stand: Why Inequality Keeps Rising*, OECD Publishing.

- Oesch D. and Rodriguez Menes J. (2011), Upgrading or polarization? Occupational change in Britain, Germany, Spain and Switzerland, 1990-2008, in *Socio-Economic Review*, 9, 503-532.
- Oswald A.J. (1997), Happiness and economic performance, in *The Economic Journal*, 107(445), 1815-1831.
- Paci M. (1979), Class Structure in Italian Society, in *European Journal of Sociology*, 20, 40-55.
- Parkin F. (1971), *Class Inequality and Political Order: Social Stratification in Capitalist and Communist Societies*, Praeger, New York.
- Partridge M.D. (1997), Is Inequality Harmful for Growth? Comment, in *American Economic Review*, 87, 1019-1032.
- Pisano E. and Tedeschi S. (2007), Tendenze della distribuzione dei redditi in Italia e impoverimento della classe media: percezione o realtà?, in *Meridiana*, 59-60.
- Pressman S. (2007), The Decline of the Middle Class: An International Perspective, in *Journal of Economic Issues*, 41, 181-201.
- Polin V. and Raitano M. (2014), Poverty Transition and Trigger Events across EU Groups of Countries: Evidences from EU-SILC, in *Journal of Social Policy*, 43(2), 745-772.
- Ravallion M. (2010), The developing world's bulging (but vulnerable) middle class, in *World Development*, 38(4), 445-454.
- Rizzello S. (2000), Economic Change, Subjective Perception and Institutional Evolution, in *Metroeconomica*, 51(2), 127-150.

- Rossi M., Borraz F. and Gonzalez N. (2011), *Polarization and the Middle Class*, available at SSRN: <http://ssrn.com/abstract=2158437>.
- Runciman W.G. (1966), *Relative deprivation and social justice: a study of attitudes to social inequality in twentieth-century, England*, University of California Press.
- Sassoon D. (1997), *Contemporary Italy: politics, economy and society since 1945*, Routledge, London.
- Scott J. (1996), *Stratification and Power: structures of class, status and command*, Polity Press, Cambridge.
- Solimano A. (2008), Stylized Facts on the Middle Class and the Development Process, in Estache A. and Leipziger D. (edited by), *Stuck in the Middle: Is Fiscal Policy Failing the Middle Class?*, Brooking Institution Press, Washigton DC.
- Stouffer S.A., Suchman E.A., de Vinney L.C., Star S.A. and Williams R. Jr. (1949), *The American Soldier: Adjustment During Army Life*, Princeton University Press, Princeton NJ.
- Sylos Labini P. (1974), *Saggio sulle classi sociali*, Laterza, Bari.
- Sylos Labini P. (1986), *Le classi sociali negli anni '80*, Laterza, Bari.
- Thurow L.C. (1984), *The Disappearance of the Middle Class*, New York Times, February 5.
- Torche F. and López-Calva L. (2013), Stability and Vulnerability of the Latin American Middle Class, in *Oxford Development Studies*, Taylor & Francis Journals, 41(4), 409-435.
- Treiman D.J. (1977), *Occupational Prestige in Comparative Perspective*, Academic Press, New York.

- Trigilia C. (1976), Sviluppo, sottosviluppo e classi sociali in Italia, in *Rassegna italiana di sociologia*, 2, 249-295.
- Van Kerm, P. (2006), Comparisons of income mobility profiles, *IRISS Working Paper Series*, 2006-03, IRISS at CEPS/INSTEAD.
- Van Kerm, P. (2009a), Income mobility profiles, in *Economics Letters*, 102(2), 93-95.
- Van Kerm, P. (2009b), sgini-Generalized Gini and Concentration coefficients (with factor decomposition) in Stata. v1.1 (revised February 2010).
- Van Praag B.M.S. and Ferrer-i-Carbonell A. (2006), An Almost Integration-free Approach to Ordered Response Models, *Tinbergen Institute Discussion Paper*, TI 2006-047/3.
- Vitali A., Aassve A. and Furstenberg F.F. (2014), Wealth inequalities across generations, in *ESRC Centre for Population Change Working Paper Series*, 46, University of Southampton.
- Vittori C. (2011), *Mobility, Inequality and Polarization*, Ph.D Dissertation, University of Bristol.
- Wang A. and Tsui K. (2000), Polarization Orderings and New Classes of Polarization Indices, in *Journal of Public Economic Theory*, 2, 349-363.
- Watson G.S. (1964), Smooth regression analysis, in *Sankhya Series*, A 26, 359-372.
- Whelan C. and Maitre B. (2010), Protecting the vulnerable: poverty and social exclusion in ireland as the economic crisis emerged, in *Working Papers Geary Institute*, University College Dublin, Geary Institute, University College Dublin.
- Wolfson M.C. (1989), Inequality and Polarization: Is There a Disappearing Middle Class in Canada?, mimeo.

- Wolfson M.C. (1994), When Inequalities Diverge, in *The American Economic Review*, 84, 353-358.
- Wolfson M.C. (1997), Divergent Inequalities: Theory and Empirical Results, in *Review of Income and Wealth*, 43, 401-421.
- World Bank (2000), *World Development Report 2000/2001: Attacking Poverty*, World Bank, Washington
- Wright E.O. (1979), *Class Structure and Income Determination*, Academic Press, New York.
- Wright E.O. (1997), *Class Counts: Comparative Studies in Class Analysis*, Cambridge University Press, Cambridge.
- Wright E.O. (2005), *Approaches to Class Analysis*, Cambridge University Press, Cambridge.
- Wright E.O. and Singelmann J. (1982), Proletarianization in the American Class Structure, in Burawoy M. and Skocpol T.(edited by), *Marxist Inquiries: Studies of Labor, Class and States*, supplement to *the American Journal of Sociology*, 88, 176-209.
- Yamaguchi K. and Wang Y. (2002), Class Identification of Married Employed Women and Men in America, in *American Journal of Sociology*, 108(2), 440-475.
- Zhang X. and Kanbur R. (2001), What Difference Do Polarization Measures Make? An Application to China, in *Journal of Development Studies*, 37, 85-98.
- Zheng B. (2011), A new approach to measure socioeconomic inequality in health, in *Journal of Economic Inequality*, 9, 555-577.