

INEQUALITY DECOMPOSITION: A COMPARISON BETWEEN ITALY AND AUSTRIA



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Abstract: *The aim of the present paper is to implement an inequality decomposition exercise, focusing on two developed countries, Italy and Austria. Specifically, inequality is divided into an “ethically acceptable” portion and an “ethically unacceptable” share. We use data from the Luxembourg Income Study (LIS) database, referring to the year 2016. Both non-parametric and regression-based decomposition techniques are exploited. Individual income and consumption expenditure are analyzed as individual objectives. Overall, we found a considerable amount of “ethically unacceptable” inequality determined by family background in Italy, either compared to Austria and in general terms.*

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1. Introduction & research questions

The topic of economic inequality is gaining increasing attention among researchers and into the public debate, especially from the publication of the book “Capital in the Twenty-First Century”, written by the French economist Thomas Piketty and published in 2014. The central thesis of his analysis is the presence of particular mechanisms intrinsic to capitalism as it is, which results in a great accumulation of wealth and richness under the domain of few individuals. Inequality, in terms of economic discrepancies within a particular society, is then the outcome of predetermined political, social and economic decisions. There is a branch of literature which is specialized in decomposing inequality between an “ethically acceptable” part and an “ethically unacceptable” share. This definition is reported in Checchi and Peragine (2009), and in other related studies. The “ethically unacceptable” proportion of inequality is determined by circumstances which go beyond individuals’ control (an individual cannot influence them, therefore the resulting inequality is seen as unethical), such as family background or gender, and it is also defined as inequality of opportunities. A commonly recognized welfare theory is that high values of inequality caused by beyond control characteristics, should lead governments to assist individuals in better ways, through targeted economic and social programs. This might be one of the reasons behind the fact that the majority of such inequality analyses examine developing rather than developed countries, as long as cultural beliefs or ideologies could determine a higher “ethically unacceptable” share of inequality in the former category of countries, compared to the latter. Examples of studies analyzing opportunity inequality in developing countries are Ferreira and Gignoux (2008), ELMO (2007) and Lanjouw and Rao (2010). The aim of the present paper is to implement an inequality decomposition exercise, focusing on two developed countries, Italy and Austria. We chose Italy since several previous studies such as Checchi and Peragine (2005), Checchi, Peragine and Serlenga (2009) and Checchi and Peragine (2009) have detected relatively high levels of opportunity inequality in this country, hence a confirmation of these outcomes is expected. Austria perfectly fits the role of second term within the comparison, given that either similarities and differences occur between the two countries. Indeed, they share a border and they are both advanced European economies, with important GDP values and high standards of life. On the other hand, geographic composition and dimensions are really different, in fact Italy is often classified as an economy belonging to the south of Europe, whereas Austria has more in common with economies composing continental Europe. By confronting two countries, we are able to interpret our results in a proportional way and to better understand the real incidence of opportunity inequality. The general hypothesis which is tested is that in Austria, there is a more egalitarian society compared to Italy -i.e., less inequality of opportunities, by considering the same beyond individuals’ control characteristics. If this will be the case, we will have found evidences to sustain policies for Italy aimed at better integrating targeted categories within the society, and at leveling unfair economic disparities. The remaining of the paper is structured as follows: in section 2, the adopted methodology is presented and explained, section 3 discusses data and the specific beyond control circumstances analyzed, in section 4 results are displayed, section 5 links our outcomes with existing literature and section 6 concludes.

2. Methodology

This section offers an explanation of the methodology used in order to decompose inequality into within-group and between-group shares. The first operation consists of partitioning the population under examination into sub-categories. As reported within Cowell and Jenkins (1995), if a population is divided into sub-categories π , additively decomposable inequality indicators may be expressed with the following notation:

$$I = I_w (\Pi) + I_B (\Pi)$$

where $I_w (\Pi)$ represents a weighted average of inequality within population sub-categories, whereas $I_B (\Pi)$ is the so called between-group inequality. The latter might be seen as the inequality that would have occurred in a population if each individual owned the average income of his/her specific sub-category. In fact, by rearranging the population following the aforementioned criterium, the income that a particular person earns is solely determined by the sub-category which he/she belongs to. Thus, differences in income gained by an individual only depend on being part of distinct population sub-groups. If these sub-groups are obtained by partitioning the population for beyond individuals' control characteristics such as gender or parents background, it appears straightforward that income discrepancies among sub-categories are ethically unacceptable. It does not occur any personal effort in being born male or female, from a rich rather than a working-class family, therefore within an equal and fair society, the level of between-group inequality should be zero when such beyond individuals' control categories are defined. The part of inequality which exists as a consequence of people different attitudes (propensity to work, developed skills, etc.) is on the contrary ethically acceptable in a meritocratic society where whoever puts more effort than the others is rewarded, and this amount corresponds to within-group inequality in the present framework. This approach is in line with Checchi and Peragine (2009), since personal attitudes include the grade of effort which an individual puts into his/her personal development, but also all other background characteristics which are not beyond individuals' control and might influence his/her achievements. To report their notation (circumstances are characteristics beyond individuals' control and effort is what we called personal attitudes), income may be represented as a function $g : \Omega \times \Theta \rightarrow \mathbb{R}_+$ which associates individual incomes to a mix of effort and circumstances: $x = g(c,e)$ -where c are circumstances and e effort. Consequently, also the present study exploits a pure deterministic model, within which any change in individual income is assumed to be caused by personal attitudes. This is a deviation from standard Mincerian models of income formation, where incomes are determined by beyond individuals' control characteristics, proxies for personal attitudes and a random component (usually identically and independently distributed). The inclusion of factors such as native ability or luck into personal attitudes is an assumption which might lead to an overestimation of the ethically acceptable amount of inequality. In fact, talent or fortune are the outcomes of many unobservable and unmeasurable circumstances. Nevertheless, as sustained in Checchi and Peragine (2009), if a society reveals inequality of opportunity even in an extremely deterministic scenario, then a 'minimal' compensatory policy on beyond individuals' characteristics should be implemented. Whereas beyond individuals' characteristics are easily observable in a society (i.e., through national surveys or census), personal attitudes are unobservable. Hence, the income function g is unobservable as well, but two assumptions are necessary, and we take them also from Checchi and Peragine (2009). Specifically, the function g increases monotonically in personal attitudes (or effort in their framework), and their conditional distribution is independent from beyond individuals' characteristics distribution. The first one is

quite intuitive (higher incomes correspond to higher levels of talent), whilst the second one is worth of an example to clarify -we take it from Checchi and Peragine (2009). The level of education reached by an individual is the jointed outcome of beyond individuals' control characteristics such as parental background and personal attitude (perseverance in studying), thus circumstances and effort distributions are not independent when personal education is considered. Accordingly, individual level of education cannot be embodied into beyond individuals' control characteristics vector. The inequality indexes which are most commonly used in this field of literature come from General Entropy class, and specifically, the present analysis makes use of the mean logarithmic deviation (MLD), an indicator that exploits arithmetic mean as representative income. Besides, MLD is the only path-independent inequality measure, as reported in Checchi and Peragine (2009). Path independency is well described within Ferreira and Gignoux (2008), when they distinguish between a smoothed and a standardized distribution. Particularly, a smoothed distribution is generated from replacing y_i^k (a partition of the population into K sub-groups) with the group-specific mean μ^k , while a standardized distribution is obtained by substituting y_i^k with $y_i^k \frac{\mu}{\mu^k}$ (μ is the grand mean). It is straightforward that a smoothed distribution eliminates all within-group inequality as a result of its calculation, while a standardized one erases all between-group inequality. Consequently, the authors define θ_d , which is the ratio of inequality in the smoothed distribution to the inequality in the original distribution. This measure sums up between-group inequality in the partition directly, thus the subscript d. Nevertheless, also what is defined as θ_r (r because is computed residually), which is equal to one minus the ratio of inequality in the standardized distribution to the inequality in the original distribution, is another perfectly logical indicator of inequality of opportunities. Although these two decomposition paths lead both to a proxy of inequality of opportunities, they produce divergent measures of the share of between-group inequality, creating interpretation issues. Hence, MLD is mainly used to overcome this problem. Borrowing the notation from Checchi and Peragine (2009), for a distribution $X = (x_1, \dots, x_N)$ with mean μ_X , the mean logarithmic deviation may be written as $MLD(X) = \frac{1}{N} \sum_{i=1}^N \ln \frac{\mu_X}{x_i}$. So far, only income differences have been discussed as individual objective to concretely measure inequality in economic outcomes, nonetheless also consumption expenditure is widely used as alternative indicator in related literature. In order to examine this index even within the present framework, a specific data manipulation procedure ought to be implemented. In fact, consumption expenditure information is available only at household level in our data, whilst individual characteristics are by definition referred to individuals, thus data concerning these characteristics are obviously at individual level. To deal with the problem, we divided consumption expenditure of each household by the respective number of people composing the family unit, and then we assigned individual characteristics to these consumption shares exploiting a unique household identification code. Following this strategy, we have, for each individual, his/her own share of household consumption expenditure, plus individual characteristics such as parental background or gender. Hence, from now on, household consumption expenditure refers to the individual share of consumption expenditure within each family unit. Concerning individual characteristics, two examination methods are used within the present framework. The first one is in line with the approach adopted in Ferreira and Gignoux (2008): each beyond individuals' control characteristic is singularly studied, aiming at estimating the shares of within and between-group inequality determined by the specific circumstance. This method is also called non-parametric approach. Contrarily, the second technique, named "levels question" in the context of its original development in Fields (2003) study, allows to compute the contribution in percentage terms to total income or consumption expenditure inequality of more beyond individuals' control characteristics considered together. This is possible through the implementation of a regression-based decomposition method, which exploits a log-linear model

where the individual objective¹ functions as dependent variable, whilst circumstances constitute the right side of the equation, thus behaving as explanatory variables. Some sort of analogy might be drawn by comparing such a technique and what is defined as parametric approach, since they both evaluate the impact of more beyond individuals' control characteristics considered at the same time. In their paper, Marrero and Rodriguez (2012) underline the fact that fitness of either parametric and non-parametric approach is mainly influenced by sample size and observed beyond individuals' control characteristics in the data. Given that, it seems logical to test the performance of both techniques, with the aim of comparing differences or similarities in the outcomes. Furthermore, robustness in the results is verified also by using data from different years. One last important remark concerning the interpretation of the inequality measures that we are going to present, as pointed out in Ferreira and Gignoux (2008): the estimates should be seen as a 'lower bound' of opportunity inequality. The reason behind is straightforward: it is quite unrealistic to assume that any analysis of a similar kind is able to fully incorporate all relevant individual variables and circumstances which determine the economic outcome of an individual, and this is a necessary requirement for "true" inequality of opportunities measures.

¹ Following the strategy proposed in Fields (2003), only individual income is used as individual objective. The reason is the following: when consumption expenditure is considered, the coefficients and the residuals do not add up to 100 percent, as they should do.

3. Data

Within this section, data and descriptive statistics are presented and illustrated. The present analysis relies on LIS (Luxembourg Income Study) database, which “acquires datasets with income, wealth, employment, and demographic data from many high- and middle-income countries”. Moreover, these data allow to perform cross-national comparisons, therefore they perfectly fit our purpose of confronting Italy and Austria. The final datasets report the results gathered through surveys at micro-level, i.e. at household and individual level. The most recent years for which we have data are 2016 and 2014 for Italy, and 2016 and 2010 for Austria. Consequently, this study offers a static overview of inequality of opportunities in two different time periods for each of the two countries. The Survey of Household Income and Wealth (SHIW) is done by the Bank of Italy, and the 2014 version collects data of 8156 households containing 19366 individuals. Surprisingly, the same information is reported also for 2016 dataset (8156 households and 19366 individuals), but we are sure that this is just a wrong update on the website. Indeed, the two samples show different descriptive statistics, and they lead to different results through the analysis. We may furnish the numbers obtained by summing up individuals belonging to different population sub-groups in 2016, such as men/women and households’ region of residence: following this strategy, there are 7421 households and 16464 individuals. The Survey on Income and Living Conditions (SILC) has Statistics Austria as responsible institution, and within the reference period 2016, it collects data about 6090 households, including 12876 individuals. The 2010 version gathers data across 6187 households including 13933 persons. The individuals’ characteristics by which the two populations will be partitioned into are the following: parental background, sex, being an immigrant and region of residence. Regarding education background of parents, two variables are available, namely education of mother and education of father, and they distinguish at least between low (including no education at all), medium and high level of education. These variables function as a proxy of the economic level and cultural background of a household, assuming that parents with higher education cover more prestigious and better rewarded work positions, guaranteeing a brighter future for their descendants. Since education standards are quite harmonized across western European countries, it is likely that for example a medium level of education indicates the same achievements in school in either Italy and Austria. Specifically, in our case we have more than three levels of attained parental education in both countries. In Italy, there are six possible outcomes, and we report them in ascending order (from lowest to highest level of education): none, primary school, lower secondary school, upper secondary school diploma, five-year university degree and postgraduate qualification. In Austria there are six levels as well, even though the nomenclature is slightly different compared to Italy (again, they are presented in ascending order): compulsory school, apprenticeship with vocational school, technical or commercial school, matura, degree at a university and other qualification after the Matura². Tables 1 and 2 display the number of individuals belonging to each mother’s and father’s level of education category, for Italy and Austria respectively. Furthermore, graphs sketching individual income cumulative distribution conditional on mother’s and father’s education for year 2016 in the two countries are reported (graphs 1,2,3 and 4). From these distributions, it might be noticed that parents’ level of education determines more income differences in Italy rather than in Austria, where the lines corresponding to the various categories are more attached between each other. Concerning gender, the variable sex indicates whether a respondent is male or female. In 2016 datasets, 7889 individuals are men and 8575 are women in Italy, while in Austria 6228 individuals are men and 6648 are women. In 2014 Italian sample there are 9290 men and 10076 women, whereas Austria 2010 edition contains 6674 men

² Contrarily to Italy, in Austria the category ‘none’ as possible mother’s and father’s level of education does not exist.

and 7259 women. The variable immigrant is a dummy, being 0 when an individual is not an immigrant and 1 when he/she is. We acknowledge that being an immigrant might be seen as one of those characteristics for which beyond control circumstances and effort are not independently distributed, consequently it should not be considered a beyond individuals' control factor, as pointed out in Checchi and Peragine (2009). Yet, since data about race or ethnicity (largely used in related literature) are not available for neither Italy nor Austria, this dummy indicator may function as proxy for a wide distinction between natives and foreigners. Additionally, if we assume that an individual emigrates only if it is extremely necessary (i.e., escaping from wars or extreme poverty), this last resort option of going to another country could be considered beyond individuals' control, since there is no alternative choice. Our 2016 samples gather data about 15300 natives and 1164 immigrants in Italy, whilst in Austria natives are 10915 and immigrants are 1958 (with 3 not specified values). The 2014 sample of Italy embodies 18002 natives and 1364 immigrants, the 2010 Austrian dataset contains 11962 natives and 1966 immigrants (with 5 not specified values). Finally, region of residence -in European countries, this variable typically includes the Nomenclature of Territorial Units for Statistics (NUTS) at the lowest level available in the data- might be useful to study territorial differences (i.e., the already documented North-South economic discrepancy in Italy). Although recognizing that region of birth could have been a better indicator in terms of individual responsibility (a person cannot choose where to born, but he/she may choose where to live), this variable is not available within LIS database. Moreover, region of residence is used in Checchi and Peragine (2009) analysis as well, and it is considered a beyond individuals' control characteristic. Italy has twenty regions, and we distinguished between north and south following the regrouping proposed in Checchi and Peragine (2009)³, whereas Austria is divided into nine districts⁴ in our data, but we rearranged them into Vienna district (the capital city) and all the others gathered in one unique ensemble. The latter operation is done in order to have comparable results when partitioning the population by residence region, since Italy has two macro-groups (north and south). We choose Vienna as representative district for Austria since it is the capital city, hence it is expected to be the core of most economic activities, functioning as counterpart of north district in Italy, which is more economically developed than the south. Data about region of residence are available only at household level. Specifically, in 2016, Italy has 3198 households living in the north and 4223 living in the south, while in Austria 1372 families live in Vienna district and 4718 live outside of it. Within the 2014 dataset, there are 3687 households in the north and 4469 in the south of Italy. The 2010 edition of Austria reports 1315 families living in Vienna district, and 4872 living in other areas. Regarding individual objectives (individual income or household consumption expenditure), two important clarifications have to be made explicit. The first one is that individuals and households presenting zero or negative values as income or consumption are excluded from every computation. The objective of this manipulation is to make our estimates as much representative as possible of the actual workers or consumers within the two populations. The second specification concerns a lack of data: household consumption expenditure is available only for Italy, and not for Austria. Therefore we are able to present our outcomes in terms of household consumption expenditure just for Italy. In order to compare the two countries when partitioning the populations by region of residence⁵, total household income is used as individual objective.

³ North embodies Piemonte, Val d'Aosta, Liguria, Lombardia, Veneto, Friuli Venezia Giulia, Trentino Alto Adige and Emilia Romagna, while south all the other regions

⁴ Burgenland, Niederösterreich, Wien, Kärnten, Steiermark, Oberösterreich, Salzburg, Tirol and Vorarlberg

⁵ As already said, information about region of residence is available only at household level

4. Results

This section displays the results obtained by using data from 2016. It first proposes a general overview on inequality in the two countries, then the non-parametric approach is adopted, and finally the “levels question” technique is implemented. As last sub-section, a robustness check of the obtained results is implemented and examined. The first empirical aspect which is discussed within this section is the overall amount of inequality that Italy and Austria present in terms of individual income, household consumption expenditure and household total income, expressed through MLD. As a reminder, MLD values do not have an upper limit, but the closer to zero, the lower total inequality is experienced. By looking at the first row of tables 3 and 5, it might be noticed that Italy shows a MLD value of 0.26 when considering individual income, whilst Austria has a value of 0.40. The interpretation is the following: Austria presents a greater total inequality regarding level of individual income. Moving to household consumption expenditure as individual objective (table 9), Italy reports a MLD value of 0.17, thus a lower total inequality level compared to the previous case where individual income was used. When household total income is considered (tables 11 and 13), Italy results in a MLD value of 0.33, whereas Austria has a value of 0.30. At a first glance, we would have to conclude that Austria is a more unequal country when considering individual income, which actually goes against our original hypothesis that Austrian society is more egalitarian. Additionally, our MLD estimate for Austria deviates from already existing research such as Checchi, Peragine and Serlenga (2008), where income inequality causes a MLD value of 0.16, thus less than an half of the value computed in the present framework. Here though, the previously described decomposition methodology becomes handy, as long as we are able to discern among within and between group inequality. Indeed, following our assumptions allows us to distinguish between the amount of total inequality which is ethically acceptable (within-group inequality) and the ethically unacceptable part (between-group inequality).

Single circumstance approach (non-parametric approach)

As already mentioned, the starting point after this preliminary exploration consists of partitioning the two populations by each beyond individuals’ control characteristic singularly, starting from education level of parents. The level of education reached by the mother accounts for 13.7 % of total individual income inequality in Italy (table 3), that is: when dividing the population by mothers’ educational achievements, between-group inequality represents almost 14 % of total inequality. In Austria (table 5), the situation is considerably different, in fact the education of the mother determines a between-group inequality which is 1.16 % of total inequality, thus a really small fraction. The interpretation is straightforward: the cultural level of the mother causes more inequality of opportunities in Italy than in Austria, which means that Austrian society appears to be more egalitarian concerning this particular aspect. Analogous deductions may be drawn when education level of father is exploited. Indeed, fathers’ cultural background is responsible for 16.2 % of total inequality in Italy, whilst in Austria it only accounts for 1.8 % of total inequality. Even in this case the difference is huge, confirming what we already deduced when partitioning the two populations by mother’s education: in Austria, the background cultural level of a household does not influence the individual income of a person as much as in Italy. As already pointed out, within this framework parental education level is a proxy of overall household wealth, which in Italy appears to be more important in order to reach higher levels of income. When using household consumption expenditure as individual objective (table 9), Italy shows a considerably lower amount of between-group inequality, namely 3 % and 3.5 % of total inequality determined by education of mother and father respectively. The level of between-group inequality which we found in Italy using

income as individual objective confirms the results from Checchi and Peragine (2009). In fact, in their research, the authors observe a between-group inequality ranging between 16.6 % and 19.5 %, when the population is split by parental background (education attained by mother and father are considered together) and region of residence. We are not able to replicate exactly the same partition, since in Checchi and Peragine (2009) individual income data are exploited, whereas within the present framework region of residence is evaluated only at household level. Taking into consideration the aggregation of mother's and father's education and the finer sub-categories defined in Checchi and Peragine (2009), our range of 14-16 % of between-group inequality is in line with their results. The next beyond individuals' control circumstance being considered is gender, meaning that the two populations are divided into men and women. In this case, between-group inequality is 6 % of total inequality in Italy and 8.6 % in Austria⁶. Contrarily to our assumption, this outcome points out a worse situation in Austria rather than in Italy, concerning the amount of opportunity inequality determined by gender difference. Moving to the natives/immigrants partition, between-group inequality accounts for 1.13 % of total inequality in Italy (0.4 % exploiting consumption expenditure rather than individual income) and for 0.5 % in Austria. Even though these inequality fractions are really small, especially if compared with between-group inequality amounts caused by level of parents' education sub-partitions, it should be noticed that the level of inequality of opportunities determined by being an immigrant in Italy is more than the double of Austria's level.

Regression-based decomposition method (levels question)

In order to decompose inequality using multiple circumstances at the same time, we implement a multivariate regression-based decomposition method, aiming at understanding the contribution to total inequality of more individual characteristics considered together. Again, the first two circumstances discussed and analyzed within Italian and Austrian populations regard parents' level of education. When the contributions of mother's and father's level of education are summed up together, they have a weight of 12.4 % on total inequality (table 7, individual income as individual objective) in Italy, and they determine 1.5 % of total inequality in Austria (table 8). The much higher influence of this particular beyond control circumstance in Italy rather than in Austria, already found by using the non-parametric approach, is confirmed by applying the regression-based decomposition method. The third beyond individuals' control characteristic which is examined within the framework is gender, and here the previous insight coming from the non-parametric approach, namely Italy being more egalitarian than Austria regarding this particular aspect, are disproved. In fact, gender accounts for 6.8 % of total inequality in Italy, whereas it produces 5.9 % of total inequality in Austria. Finally, the immigrant/native dummy variable has a quite similar weight on total inequality across the two countries: 1.16 % in Italy and 1.01 in Austria. Also in this context, a discrepancy in the results occur between the non-parametric approach and the regression-based decomposition method. When all the four circumstances (mother's education, father's education, gender and being an immigrant) are contemplated together, they explain 20.4 % of total inequality in Italy, and 8.4 % of total inequality in Austria.

The analysis now shifts towards region of residence as particular beyond control circumstance, with the objective of exploring potential discrepancies between Italy and Austria. In fact, fundamental economic differences among regions in the north and regions in the south of Italy have been already

⁶ Here only individual income is discussed as individual objective. When examining household consumption expenditure in table 9, the amount of between-group inequality determined by gender is a really small number. Additionally, with individual income data, it is possible to compare the two countries.

pointed out within similar empirical studies such as Checchi and Peragine (2009), and it would be interesting to assess whether a similar pattern occurs in Austria as well. Unavoidably, the comparison is possible only when total household income is used as individual objective (tables 11 and 13), since household consumption expenditure data are not available for Austria and information concerning region of residence occurs at household level. Nevertheless, by exploiting the division of household consumption expenditure into individual shares which was implemented for Italy, we are able to analyze region of residence as a specific characteristic within the non-parametric approach and use consumption expenditure as individual objective (table 9). When dividing the two populations by region of residence and using total household income as individual objective, between-group inequality in Italy is 2.6 % of total inequality, whilst in Austria is only 0.04 %. The level of opportunities inequality determined with the partition solely by region of residence is reduced in Italy, when consumption expenditure is used as individual objective (0.04 % of total inequality, as it might be deduced from table 9). Thus, the comparison between the two countries highlights a situation where the share of inequality determined by region of residence is higher in Italy than in Austria. Nonetheless, the change of individual objective (from individual income to consumption expenditure) within the computation slightly weakens the robustness of Italian results, since the amount of between-group inequality caused by region of residence significantly decreases from 2.6 % to 0.04 %.

Robustness check

With the objective of testing the robustness of the outcomes obtained so far, we change our analyzed samples, using data from different years for both countries. Specifically, 2014 data are assessed for Italy, and 2010 data are exploited for Austria (2014 Austrian edition of the survey does not report information concerning population weights, which are fundamental to achieve representative results). The structure of this sub-section is in line with the previous paragraph: the non-parametric approach is the starting point, followed by outcomes collected through the regression-based decomposition method, with a final focus on region of residence as particular beyond individuals' control characteristic. Given the logic behind a robustness check, only significant similarities or differences with the results found by using data from 2016 are explicitly reported. For both countries, the overall level of total inequality measured through MLD is practically the same as the respective values obtained by using 2016 data (first row of table 4 and table 6). With the implementation of the non-parametric approach, the resulting numbers confirm the insights already noticed in the previous paragraph: the level of education of either mother and father produces a much higher share of between-group inequality in Italy than in Austria, and the gender population sub-partition determines a slightly bigger amount of opportunity inequality in Austria, compared to Italy (7.4 % and 5.6 %, respectively). The only discrepancy regards the immigrant dummy variable, which in this context generates almost the same level of between-group inequality in the two countries, as it might be deduced from the last row of table 4 and table 6. Moving to the regression-based decomposition method, the influence of family cultural background on total inequality in Italy is at the same level of 2016, even by using data from 2014. Contrarily, mother's and father's level of education determine a quite higher share of total inequality within the 2010 Austrian sample, compared to 2016 outcomes (table 8), but the amount is still lower than estimates for Italy. Gender now explains practically the same percentage of total inequality across the two countries (8.7 % in Italy and 8.9 % in Austria), and being an immigrant has a greater weight on total inequality in 2010 Austrian sample, rather than in 2014 Italian one (2.1 % and 1.1 %, respectively). When the contributions of all the four circumstances are summed

up together, estimates for Italy do not change that much across the two different time periods, whilst in Austria the contribution to total inequality is 4 % higher in 2010, compared to 2016.

Concerning region of residence, the results of the non-parametric approach when individual income is used as individual objective strengthen findings in 2016 samples: this particular factor generates more between-group inequality in Italy than in Austria (table 12 and table 14). On the other hand, by exploiting consumption expenditure as individual objective, the 2014 sample leads to a much higher amount of between-group inequality determined by region of residence (3.7 % against 0.04 % in the 2016 sample). All the other circumstances considered within table 10 cause almost the same level of between-group inequality observed in table 9.

5. Discussion

In this section, the previously found results are discussed and connected with outcomes from related studies. As already highlighted, estimates for Italy when considering parental education background as beyond control circumstance (using the non-parametric approach) confirm the amount of opportunity inequality which was computed from Checchi and Peragine (2009), even though a difference of at least 15 years occurs between data used in their analysis and information analyzed within the present framework. Moreover, other inequality decomposition exercises that discovered high inequality of opportunities in Italy have been implemented. For example, in the study by Marrero and Rodriguez (2012), the authors examine 23 European countries, among which Italy and Austria. Findings suggest that Italy is one of the countries showing the highest amount of opportunity inequality, and their results in turn validate outcomes from previously conducted analyses such as Rodriguez (2008), Lefranc et al. (2009) and Roemer et al. (2003). Checchi, Peragine and Serlenga (2008) embody also parental background in their set of circumstances, and they detect a high impact of beyond individuals' control characteristics on total inequality in Italy. Considering the results in our framework, the weight of parental cultural background on income inequality is considerably higher in Italy than in Austria, using either the parametric approach and the regression-based decomposition method. Both Italy and Austria are affirmed developed countries, hence a comparison between the bad performance of Italy concerning opportunity inequality determined by education of parents and some developing countries might reveal additional insights. Particularly, in Ferreira and Gignoux (2008), inequality of opportunities is calculated for nine developing countries of South America⁷, well known for its overall high level of economic disparities. For example, Brazil is one of the most unequal countries in the world, with a Gini coefficient of 53.9 in 2018, according to estimates from the World Bank (Italy presented a Gini coefficient of 35.9 in 2017). In their study, Ferreira and Gignoux (2008) find that the amount of total inequality determined by level of mother's education ranges between 9 % and 12 % in the considered countries. These values underline the fact that Italy is much closer to South American developing countries rather than to Austria, concerning the influence of parental background on individuals' economic outcomes. One potential explanation of this quite high share of between-group inequality might be the specific structure of the labour market in Italy. In fact, as pointed out in Checchi and Peragine (2009), more than half of Italian working population affirms to have reached the current position thanks to recommendations of friends or relatives. Hence, it seems that personal relationships play a fundamental role in obtaining a job in Italy, and as a consequence, the importance of family network acquires additional weight. It is likely that parents with higher level of education work in better paid environments, building strong connections for their descendants, whereas parents with low education hardly have this privilege. A further confirmation of this theory comes from Berloff, Modena and Villa (2011), where the influence of father's occupation on the security (in terms of stable working contracts) of descendants' job in Italy is found to be increasing over time. The work position achieved by an individual is strongly correlated with previous educational choices and the particular school track attended as students. The effect of parental education background in the context of children's school choices has also been investigated, and Checchi and Flabbi (2007) assess the specific situation of Italy and Germany. The authors find evidences to link parents' freedom to determine the type of school track to higher incidence of parental background in Italy. Furthermore, even aspiration to attend university is found to be partly determined by parents' education in Italy, whilst in Germany only secondary school type matters. Summing up, the great influence of mother's and father's education on income inequality in Italy

⁷ Brazil, Colombia, Ecuador, Guatemala, Panama and Perú.

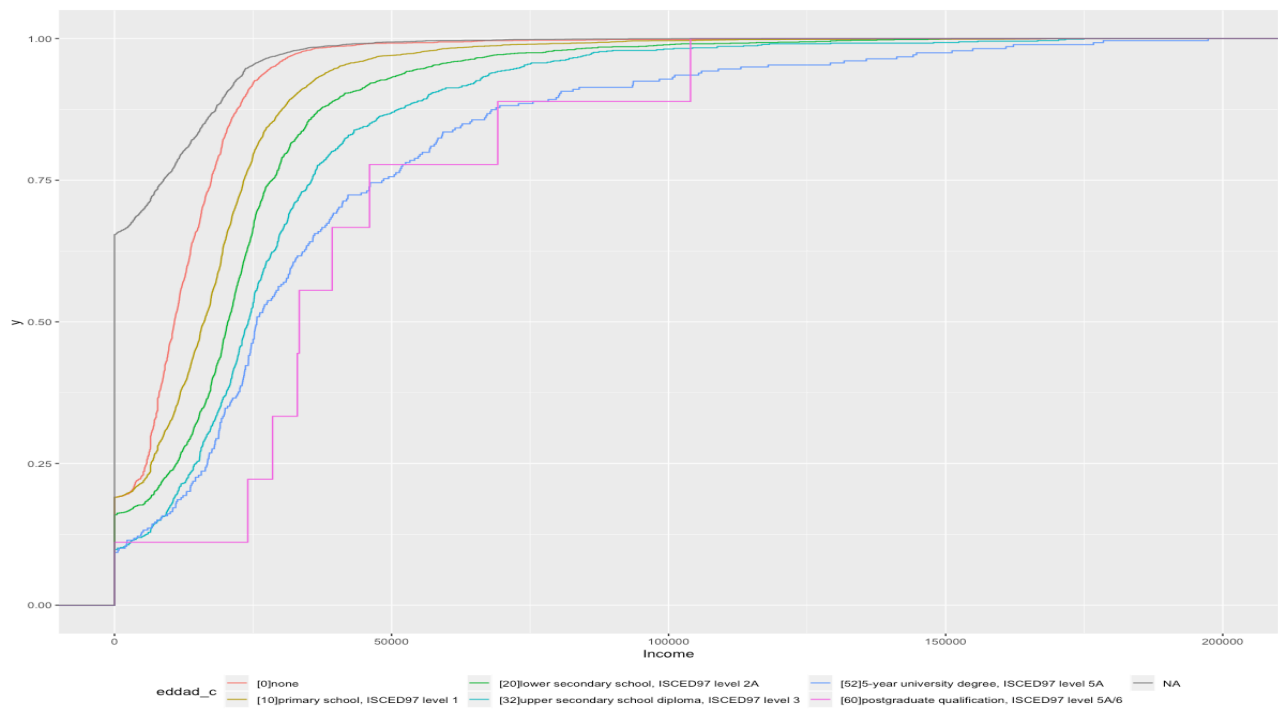
seems to have strong channels, namely the peculiar structure of labour market and the organization of the scholastic system. Moving to gender as beyond control circumstance, we identify quite similar incidence of between-group inequality on total inequality within both Italy and Austria, ranging between 5.6 % and 8.9 %. When the non-parametric approach is implemented, we find a greater share of inequality of opportunities determined by gender in Austria rather than in Italy, while the regression-based decomposition technique results in more or less the same level of between-group inequality within the two countries. Nevertheless, it ought to be noticed that in Austria, gender as circumstance generates a higher opportunity inequality than education level of parents. Some evidence may be found in the fact that childlessness is relatively high in Austria, specifically among scientists and tertiary educated women, according to Buber-Ennsner (2015). This is usually a consequence of unfairly different career opportunities between men and women, with the latter category pushed to choose whether to be a mother or a woman in career. The situation is not that different in Italy either: the birth rate from 2008 is continuously decreasing over time, highlighting the tendency of women to choose to have a career rather than to build a family, even though this should not be a trade-off, especially in developed countries, which have a longer history concerning equal rights for men and women, compared to developing countries. Regarding the impact of being an immigrant rather than a native, this variable is responsible for a low share of between-group inequality in both countries, no matter about the decomposition technique which is adopted. It is likely that this is mainly due to the reduced number of immigrants compared to natives within our considered samples, which is translated into an overrepresentation of one group (natives) over the other (immigrants), rendering estimates of between and within-group inequality not so reliable. Besides, as already said, race, ethnicity and parents' country of birth would have been better indicators, given their intrinsic nature as beyond control characteristics, but they are not available in our data. Actually, it would have been allowed to expect some greater level of between-group inequality determined by being an immigrant as circumstance, since populist parties are experiencing a great support among voters in either Italy and Austria (such information is confirmed within the report of TIMBRO authoritarian populism index⁸). Indeed, a characteristic action of this kind of political movements is to stigmatize immigrants in order to gain consensus between voters, by accusing them to emigrate abroad only to steal jobs that could have been taken by natives. Finally, we move to the last beyond individuals' control circumstance which has been analyzed, namely region of residence. The expectation was to reveal a stronger impact on total inequality determined by where an individual lives in Italy, rather than in Austria. Outcomes from our inequality decomposition exercise certify the aforementioned hypothesis, and they are in line with results found in other similar studies. In Checchi and Peragine (2009), the partition between north and south Italian regions magnifies quite significantly the share of opportunity inequality which is caused by level of parents' education. Particularly, as confirmed within Checchi and Peragine (2005), the less economically developed regions in the south of Italy experience a greater share of between-group inequality determined by beyond control characteristics, compared to regions in the north district. The really small amount of inequality of opportunities generated solely by region of residence in Austria might also be a consequence of lower representation of individuals living inside Vienna district compared to those who live outside of it, within our samples.

⁸ <https://populismindex.com/report/>

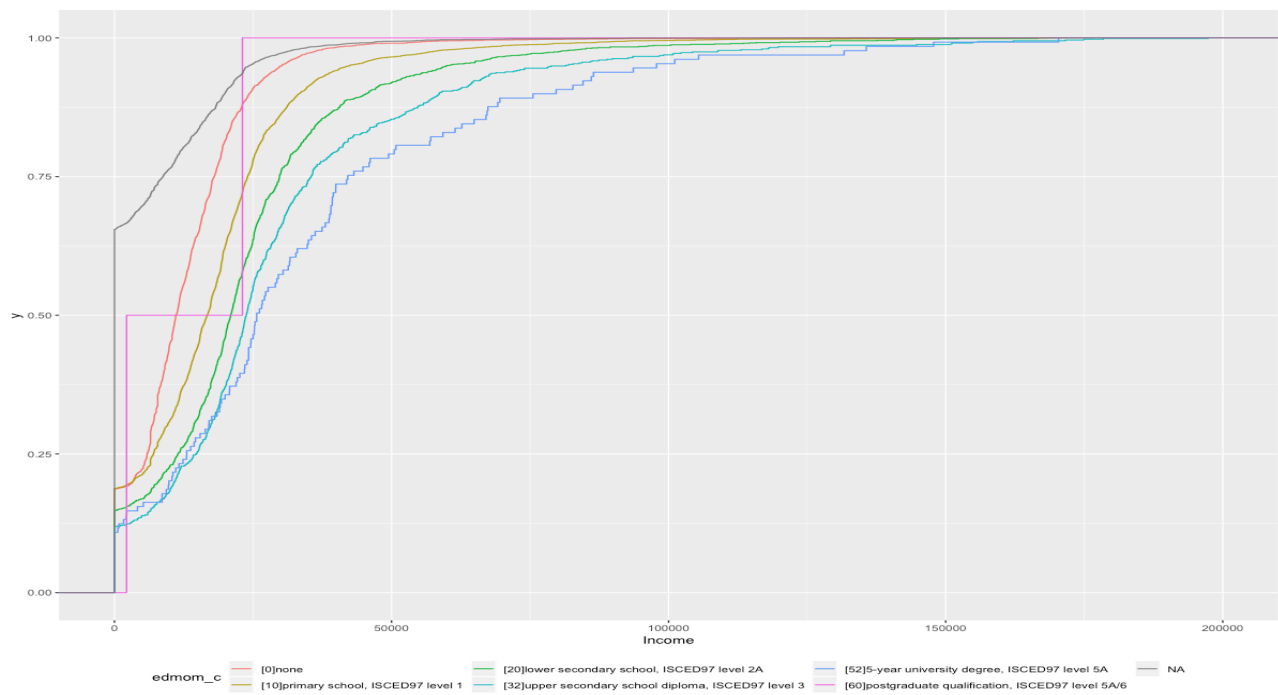
6. Conclusions & policy remarks

In this framework, the original hypothesis of Austria presenting lower levels of opportunity inequality compared to Italy has been tested and confirmed, with particular regard to family background and region of residence as beyond control characteristics. Specifically, we showed that family background determines a consistent part of income inequality in Italy. Although it may be argued that a range between 10 % and 20 % of total inequality is not so much in absolute terms, the comparison with Austria helps to understand how different the situation is among two countries which share a border. Moreover, outcomes from developing countries discussed within the previous section stress even further the peculiarity of family network context in Italy, and the urgency for a significant change aiming at removing barriers to meritocracy. In fact, we underline once more that the amount of between-group inequality is the “ethically unacceptable” share of total inequality in a specific society. As pointed out within the discussion section, such a big influence coming from mother’s and father’s education in Italy is likely to be related with labour market structure and the scholastic system. Concerning the first point, a stricter process to access work interviews may function as a solution, possibly coupled with disincentives for hiring firms to select people outside of this procedure. This would leave very small room for personal recommendations, which can still exist, but under the form of reporting, therefore needing an approval from a third neutral party. Additionally, incentives should be given to firms for hiring young workers, since the great influence of parents’ choices on descendants’ economic outcomes is a direct consequence of the overrepresentation of middle-aged people in the Italian working population. Regarding the scholastic system, parents should have less decisional power on the particular school track followed by their children, which automatically translates into more freedom for them to understand and improve their personal skills. Greater flexibility and the possibility to adjust the main subjects of interest over the years during secondary education might substitute excessive parents’ tendency to choose for their children, which is often motivated with the fact that such fundamental decisions are taken too early in life. We assessed that when partitioning the two populations by gender, the resulting level of opportunity inequality is not as high as when considering family background (in Italy), but not even as low as one would expect for two European developed countries. Welfare programs should better assist women who want to be actively engaged in working life and mothers at the same time, and governments should make profitable for firms to invest in female employees. Finally, we verified that regional disparities between north and south of Italy occur even in our data, confirming an evidence which already appeared in previous related studies. Financial funds are going to be injected into Italian economy as a consequence to the recent Covid-19 crisis, and this could really be the right chance to invest with the objective of more economic development in the south regions. Our suggestion for further research is the following: to continuously monitor the particular situation of Italy, given that we found reasons to affirm that similar patterns concerning opportunity inequality are going on since several years, and to assess whether economic changes which will occur after the Covid-19 crisis will have a positive rather than a negative effect on inequality of opportunities.

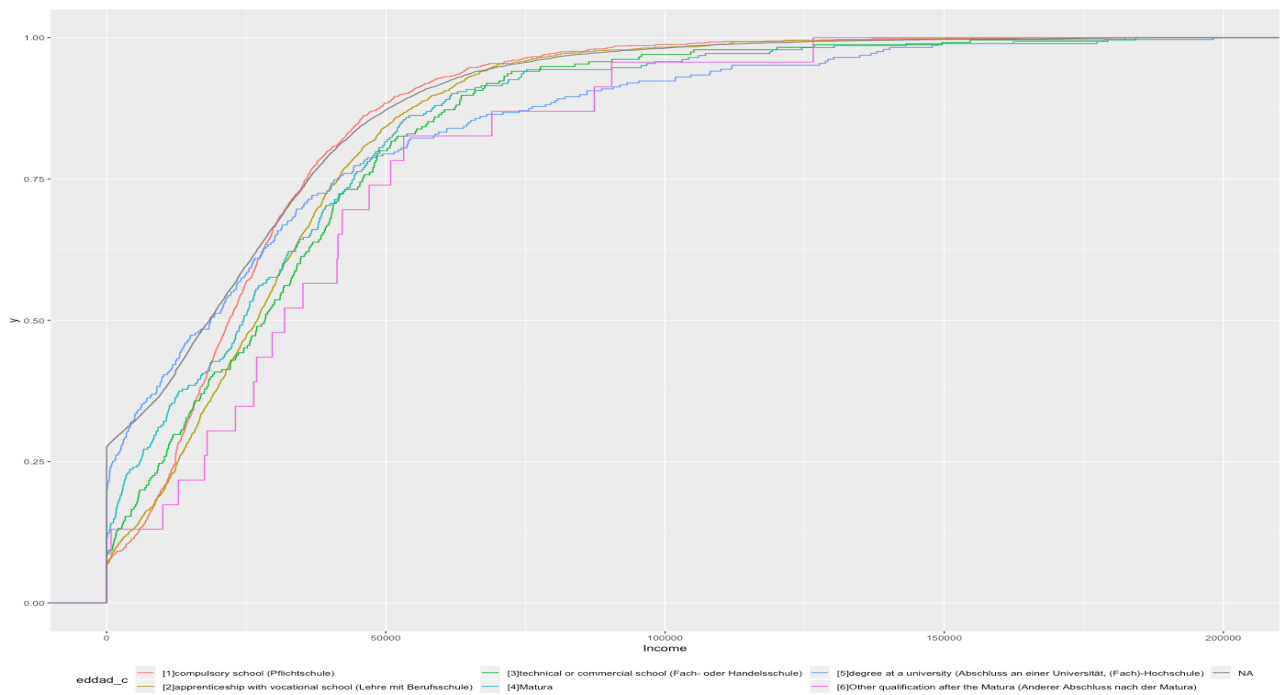
Graphs & tables



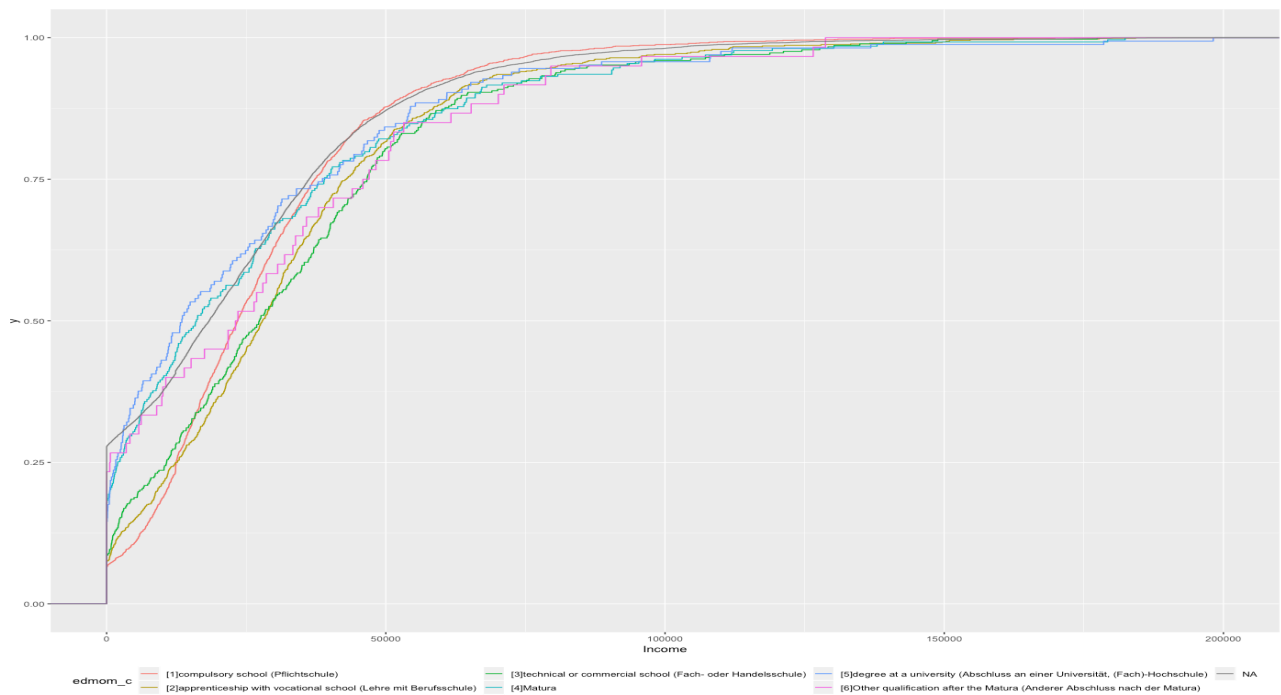
Graph 1 Individual income cumulative distribution by father's education, Italy



Graph 2 Individual income cumulative distribution by mother's education, Italy



Graph 3 Individual income cumulative distribution by father's education, Austria



Graph 4 Individual income cumulative distribution by mother's education, Austria

N° of individuals, Italy	Mother's education, 2016	Father's education, 2016	Mother's education, 2014	Father's education, 2014
None	2862	2486	3379	2901
Primary school	5854	5750	6576	6481
Lower secondary school	1534	1727	1603	1802
Upper secondary school	755	865	799	961
University degree	133	286	158	304
Postgraduate qualification	2	9	0	10
NAs	5324	5341	6851	6907

Table 1 Number of individuals having mother/father with that specific scholastic achievement, Italy, individual income as individual objective

N° of individuals, Austria	Mother's education, 2016	Father's education, 2016	Mother's education, 2010	Father's education, 2010
Compulsory school	1871	1158	3693	2429
Vocational school	819	1489	1353	2261
Technical/commercial school	377	236	676	744
Matura	264	284	239	205
University degree	166	289	210	246
Other qualification after Matura	62	24	234	471
NAs	9317	9396	7300	7452

Table 2 Number of individuals having mother/father with that specific scholastic achievement, Austria, individual income as individual objective

Italy (income 2016)	Within-group inequality (effort inequality)	Between-group inequality (opportunity inequality)	Incidence % opportunity inequality	Total income inequality
Entire population				0.2674915
By mother's education	0.2202361	0.03501088	13.71 %	0.255247
By father's education	0.2141102	0.04137139	16.19 %	0.2554816
By gender	0.2513125	0.01617897	6.04 %	0.2674915
By being immigrant/native	0.2644611	0.003030351	1.13 %	0.2674915

Table 3 Opportunity inequality, income as individual objective, non-parametric approach

Italy (income 2014)	Within-group inequality (effort inequality)	Between-group inequality (opportunity inequality)	Incidence % opportunity inequality	Total income inequality
Entire population				0.2736684
By mother's education	0.2214787	0.02924617	11.6 %	0.2507249
By father's education	0.2154446	0.03562257	14.1 %	0.2510672
By gender	0.2582607	0.01540771	5.6 %	0.2736684
By being immigrant/native	0.2716489	0.002019488	0.7 %	0.2736684

Table 4 Opportunity inequality, income as individual objective, non-parametric approach

Austria (income 2016)	Within-group inequality (effort inequality)	Between-group inequality (opportunity inequality)	Incidence % opportunity inequality	Total income inequality
Entire population				0.4010158
By mother's education	0.4416405	0.005222228	1.16 %	0.446827
By father's education	0.4385056	0.008052499	1.8 %	0.4465581
By gender	0.3662681	0.03474773	8.66 %	0.4010158
By being immigrant/native	0.398641	0.002374756	0.5 %	0.4010158

Table 5 Opportunity inequality, income as individual objective, non-parametric approach

Austria (income 2010)	Within-group inequality (effort inequality)	Between-group inequality (opportunity inequality)	Incidence % opportunity inequality	Total income inequality
Entire population				0.407693
By mother's education	0.3295893	0.008474936	2.5 %	0.3380642
By father's education	0.3306353	0.008089868	2.3 %	0.3387252
By gender	0.3772222	0.03047089	7.4 %	0.407693
By being immigrant/native	0.4051256	0.002567445	0.6 %	0.407693

Table 6 Opportunity inequality, income as individual objective, non-parametric approach

Italy (logarithm of individual income as dependent variable)	Year 2016	Year 2014
Mother's education	0.04966759	0.03694392
Father's education	0.07448476	0.07688585
Gender	0.06841839	0.08725649
Being an immigrant or a native	0.01168958	0.01107563
Residual	0.79573968	0.78783811

Table 7 Circumstance Inequality Weight of that circumstance in that year, income as individual objective, regression-based decomposition technique

Austria (logarithm of individual income as dependent variable)	Year 2016	Year 2010
Mother's education	0.012773579	0.006895369
Father's education	0.002303332	0.007416385
Gender	0.059086027	0.089243042
Being an immigrant or a native	0.010113709	0.021293514
Residual	0.915723352	0.875151690

Table 8 Circumstance Inequality Weight of that circumstance in that year, income as individual objective, regression-based decomposition technique

Italy (consumption 2016)	Within-group inequality (effort inequality)	Between-group inequality (opportunity inequality)	Incidence % opportunity inequality	Total inequality
Entire population				0.1736624
By mother's education	0.1758612	0.005396509	2.97 %	0.1812577
By father's education	0.1749612	0.006436367	3.54 %	0.1813975
By gender	0.1920671	0.0000037	0.000019 %	0.1920708
By being immigrant/native	0.1912381	0.0008326874	0.4 %	0.1920708
By region of residence	0.1832403	0.008830502	0.04 %	0.1920708

Table 9 Opportunity inequality, consumption expenditure as individual objective, non-parametric approach

Italy (consumption 2014)	Within-group inequality (effort inequality)	Between-group inequality (opportunity inequality)	Incidence % opportunity inequality	Total inequality
Entire population				0.1255417
By mother's education	0.1450478	0.003947311	2.6 %	0.1489951
By father's education	0.1434509	0.005213322	3.5 %	0.1486642
By gender	0.1613095	0.000023	0.01 %	0.1613327
By being immigrant/native	0.1600518	0.001280877	0.7 %	0.1613327
By region of residence	0.1553314	0.006001203	3.7 %	0.1613327

Table 10 Opportunity inequality, consumption expenditure as individual objective, non-parametric approach

Italy (household income 2016)	Within-group inequality (effort inequality)	Between-group inequality (opportunity inequality)	Incidence % opportunity inequality	Total income inequality
Entire population				0.3352052
By region of residence	0.3262706	0.008934607	2.6 %	0.3352052

Table 11 Opportunity inequality, total household income as individual objective, non-parametric approach

Italy (household income 2014)	Within-group inequality (effort inequality)	Between-group inequality (opportunity inequality)	Incidence % opportunity inequality	Total income inequality
Entire population				0.3317628
By region of residence	0.3233423	0.008420537	2.5 %	0.3317628

Table 12 Opportunity inequality, total household income as individual objective, non-parametric approach

Austria (household income 2016)	Within-group inequality (effort inequality)	Between-group inequality (opportunity inequality)	Incidence % opportunity inequality	Total income inequality
Entire population				0.3007333
By region of residence	0.3006087	0.0001246139	0.04 %	0.3007333

Table 13 Opportunity inequality, total household income as individual objective, non-parametric approach

Austria (household income 2010)	Within-group inequality (effort inequality)	Between-group inequality (opportunity inequality)	Incidence % opportunity inequality	Total income inequality
Entire population				0.3011627
By region of residence	0.3005792	0.0005834641	0.1 %	0.3011627

Table 14 Opportunity inequality, total household income as individual objective, non-parametric approach

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