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The evolution of inequality of opportunity across Europe: EU-SILC evidence

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24.1 Introduction

The definition of the appropriate equalitarian objective for the (re)distribution of many social and economic outcomes has been a long debated topic among scholars, which is also of central interest for policy-makers. The notion of equality of opportunity has gained popularity over the last decades as one of the relevant distributional criteria for achieving a fair allocation of resources (see Lefranc et al., 2009 or Roemer and Trannoy, 2014) ⁽¹⁹²⁾. Opportunities are equally distributed when individuals of the same 'type' (i.e., sharing similar circumstances of origin for which they cannot be held responsible), who make similar 'effort' choices (for example in terms of hours worked, educational choices, etc.), also face identical opportunity profiles. This does not imply that opportunities should coincide for everybody, but rather that factors such as the background of origin should have no direct impact on determining individual life chances.

This is, indeed, the ideal distribution of opportunities that the policymaker should target to reach an 'endowment insensitive', 'responsibility-sensitive' allocation of resources (see Fleurbaey, 2008). When, instead, individual circumstances play a role in determining opportunities, a form of *inequality of opportunity* prevails, meaning that some types enjoy/suffer an unfair advantage/disadvantage compared to others.

By seeking to promote social inclusion across the EU, one of the objectives of the Europe 2020 policy agenda (see Chapters 1 and 3 in this book) is to enhance equality of opportunity among its citizens. Indeed, as argued by Atkinson and Marlier (2010, p. 3), 'an inclusive society is one that rises above differences of race, gender, class, generation and geography to ensure equality of opportunity regardless of origin'. Yet, the extent to which this objective has been attained across the EU is disputable, and different chapters in this book are offering various perspectives on social inclusion issues in the EU.

This chapter proposes a coherent evaluation framework for assessing the inequality of opportunity dimension of social exclusion in Europe. The contribution is twofold. First, it suggests a novel way of quantifying the degree of inequality of opportunity through simple indicators, that are consistent with the normative perspectives on equality of opportunity (see Andreoli et al., 2014) and that have an appealing interpretation for the policymaker. Secondly, it illustrates the proposed measurement framework by investigating the evolution of inequality of opportunity across selected European countries between 2005 and 2011.

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⁽¹⁹²⁾ This setting follows the work of political philosophers such as Dworkin (1981), Arneson (1989) or Cohen (1989) and comprises traditional models of equality of opportunity such as Roemer (1998) and Fleurbaey (2008).

Many factors may have affected the evolution of opportunity profiles in the period we consider. The recent economic crisis, the so-called ‘Great Recession’, may have considerably reshaped individuals’ labour market opportunities, as a consequence of the interaction between the dynamics of the EU labour market and the public intervention schemes promoted by each single government. While disentangling the various mechanisms that affected the evolution of inequality of opportunity may be a difficult exercise involving a counterfactual analysis of opportunities distributions, understanding how the opportunities of different types evolved over the last decade is relevant to understand new forms of unfair disadvantage, and to provide a new perspective on the recent crisis effects. The empirical goal of this chapter is to illustrate how the measures of inequality in access to opportunities discussed hereafter can usefully complement the current set of official statistics available to the policymaker. In particular, the chapter contrasts such measures with indicators of social inequalities, such as the EU ‘at-risk-of-poverty-or-social-exclusion’ indicator (AROPE; see Chapters 1 and 3 in this book). Furthermore, it allows for an assessment of the extent of convergence of opportunity inequalities across EU countries.

One of the major empirical obstacles to the assessment of inequality of opportunity is the lack of any large scale dataset of individual outcomes and circumstances, from where opportunity profiles can be estimated, which would allow for comparisons between countries and over time. In this chapter, we make use of the 2005 and 2011 EU-SILC ad hoc modules on intergenerational transmission of disadvantage where measures of parental background for a sufficiently large number of respondents are available. We use annual labour earnings before state intervention as a measure of opportunity faced by working individuals. Indeed, gross earnings define living standards opportunities and consumption possibilities. We use paternal education (a characteristic beyond one’s control) to capture the quality of the circumstances individuals are exposed to in young age⁽¹⁹³⁾. Our model focus-

⁽¹⁹³⁾ It is well known from father-son education and income intergeneration mobility studies that more educated parents transmit significant wealth and social advantages to their children (see Jäntti and Jenkins, 2014).

es on distributional assessments, meaning that the analysis is carried out by looking at the *distribution* of opportunities for people sharing the same family background but making different effort choices.

The availability of the 2005 EU-SILC module led to several academic contributions analysing the question of inequality of opportunity across Europe, such as Checchi et al. (2010), Dunnzlaff et al. (2010) or Marrero and Rodriguez (2012). These studies have in common the use of the same underlying data but differ in their implementation of the concept of inequality of opportunity⁽¹⁹⁴⁾. To our knowledge, this chapter is the first attempt to analyse the evolution of inequality of opportunity over time by making use of the 2011 EU-SILC module⁽¹⁹⁵⁾ as well.

The chapter is organised as follows. Section 24.2 presents in more details the indices of inequality of opportunity that we propose. Section 24.3 contains the description of our empirical analysis based on EU-SILC data and Section 24.4, the results. Finally, Section 24.5 concludes.

24.2 Indices of inequality of opportunity

We assume that individual opportunities can be measured by virtue of an outcome of interest, denoted y , which is determined by three components:

- Circumstances (denoted c) capture illegitimate determinants of y that fall beyond individuals’ responsibility, such as parental background

⁽¹⁹⁴⁾ Various synthetic indicators of the extent of inequality in opportunities distribution have been used/proposed in these papers. Dunnzlaff et al. (2010) apply Gini opportunity index to the outcome variable à la Lefranc et al. (2008) to measure the average degree of advantage across pairs of opportunity profiles, evaluated according to a specific evaluation function. Marrero and Rodriguez (2012) or Checchi et al. (2010) decompose overall income inequality using regression methods à la Ferreira and Gignoux (2011) and separate the part of income that is mostly associated with circumstances from the residual component.

⁽¹⁹⁵⁾ Other papers have used the 2011 module in the context of intergenerational transmission of disadvantage analysis — a concept which bears similarity with that of EOp — e.g. Grundiza and Lopez Vilaplana (2013), Serafino and Tonkin (2014) as well as Chapter 25 in this book. The methodology in this last chapter, in particular, is based on matching methods to assess, in a form of counterfactual analysis setting, the inheritance of financial poverty. This differs substantially from the normative evaluations expressed by the EOp framework presented here.

or social origin. Individuals sharing the same circumstances belong to the same *type*.

- Effort (denoted e) captures legitimate determinants of y , that pertain to the sphere of individual responsibility.
- Attainable outcomes are contingent on a state variable (denoted s). All individuals in a society, which might represent a given country in a given period, share the same institutional background. The analysis of inequality of opportunity across states involves comparisons across countries and time.

Let $y_s(c,e)$ denote the outcome of an individual in state s with circumstances c and exerting effort e . Given effort, Equality of Opportunity (EOp) holds whenever circumstances do not contribute to explain the distribution of the outcome across the population. If individuals cannot be made accountable for their circumstances, they should not be made accountable for the correlation between circumstances and effort, either. As a consequence, the notion of responsibility that is relevant in this setting should define effort as orthogonal to the circumstances. Assuming (as in Roemer, 1998) that there is a monotonic relation between effort and outcomes for any given circumstance, and that effort has only a relativistic meaning (i.e. more effort never yields lower outcomes), then individual effort can be identified by the position p with $0 \leq p \leq 1$, that this individual occupies in the outcome's distribution made conditional on his type. We define a *quantile* $y_s(c,p)$ as the outcome level associated with position or effort p in the outcome's *Pen's Parade*, obtained by arranging outcomes by increasing magnitude ⁽¹⁹⁶⁾.

We define therefore EOp in state s as a situation where $y_s(c,p) = y_s(c',p)$ for any pair $c \neq c'$ and for any level of effort identified by the position p . When EOp holds, the opportunity profiles offered to different types exerting the same effort coincide. Al-

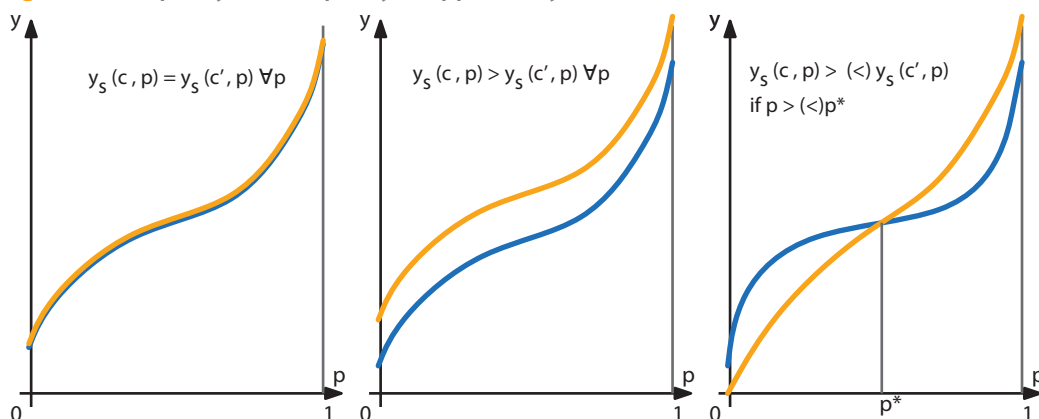
though opportunity profiles conditional on effort and circumstances are singletons (i.e. outcome levels), the hypothesis above makes the EOp criterion distributional in nature. Figure 24.1 illustrates this point. The Pen's Parades of outcomes distributions for types c and c' are reported in this figure. For each type, the curve's height in a given point (measured on the vertical axis) corresponds to the income associated with that level of effort (measured on the horizontal axis). Only the first panel displays a case where EOp is satisfied. In fact, the two types' outcome Pen's Parades coincide at every effort level. In the remaining cases, a form of *inequality of opportunity* prevails.

In the central panel of the figure, type c enjoys an *advantage* compared to type c' that holds irrespective of the effort chosen. In the right hand-side panel, type c' advantage is confined to comparisons involving low effort, while it reverses to a disadvantage at high effort. One intuitive, distributional measure of advantage is the *gap* between the opportunity profiles offered to each type at any given effort level. This is easily identifiable by the gap between outcomes Pen's Parades associated with two types c and c' , denoted: $y_s(c,p) - y_s(c',p)$, $0 \leq p \leq 1$.

The distribution of this gap is informative on the distribution and sign of advantage across pairs of types (for alternative models based on the same principle, see Lefranc et al. 2008 and Andreoli et al. 2014). We provide integrated assessments of the extent of inequality of opportunity using *inequality of opportunity indicators*, denoted IOp , that are obtained as averages of these gaps. An $IOp(s)$ indicator is a mathematical function that transforms the extent of advantage and disadvantage across types and effort levels into a number, which corresponds to the level of inequality of opportunity in state s . When, $IOp(s') \geq IOp(s)$ state s is closer to an ideal situation where EOp is satisfied compared to state s' . If EOp holds in state s , then $IOp(s) = 0$.

There are many, equally valuable, alternative formulations of the IOp indicator. Here, we focus on IOp indicators that can be expressed as the average degree of advantage in a given society. Their representation, involving pairwise comparisons of opportunity profiles, is inspired by the well-known Gini index formulation of income inequality. The

⁽¹⁹⁶⁾ To identify the outcome quantile $y_s(c,p)$, it is sufficient to represent the cumulative distribution (cdf) of outcome y , conditional on circumstances c (denoted $F_s(y|c)$, which indicates the share of population whose outcome is smaller than y) and then to measure the level of income corresponding to the poorest p -percent of the population. This quantile satisfies: $p = F_s(y_s(c,p)|c)$. The Pen's Parade is a graphical representation of the distribution of $y_s(c,p)$ at various levels of p . It is often denoted by the inverse cdf: $y_s(c,p) = F_s^{-1}(p|c)$ (see Maccheroni et al. 2005 for notation).

Figure 24.1: Equality and inequality of opportunity

Reading note: Effort (p) is measured on the horizontal axis, quantiles of outcomes (y) on the vertical axis. The yellow (blue) line refers to the distribution of outcomes of type c (c').

Gini index $Gl(\cdot)$ is, in fact, a weighted average of the gap between any pair of incomes y_i and y_j observed in a distribution:

$$Gl(y_1, \dots, y_n) = \frac{1}{2\mu_y} \sum_i \sum_j w_i \cdot w_j \cdot |y_i - y_j|$$

where w_i is unit i 's weight and μ_y denotes the average income. There are two ways of aggregating evaluations across the effort dimension: the *ex post* and the *ex ante* perspectives.

24.2.1 Ex post perspective

In the *ex post* setting, we assume that the observation of effort bears relevant information for evaluating inequality of opportunity. Given two circumstances c_i and c_j , the absolute gap between opportunity profiles is a natural metric for assessing the advantage of one type over the other. The Gini-type *ex post* inequality of opportunity index IOP_p is an average, taken across the continuous effort measure considered, of the average degree of unfair advantage across types at each effort level (as measured by a Gini inequality index):

$$IOP_p(s) = \int_0^1 Gl(y_s(c_i, p), \dots, y_s(c_N, p)) dp$$

$$= \int_0^1 \frac{1}{2\mu_s} \sum_i \sum_j w_{c_i} \cdot w_{c_j} \cdot |y_s(c_i, p) - y_s(c_j, p)| dp$$

where w_{c_i} denotes the demographic size of the type c_i and μ_s the average outcome in state s . In the *ex post* setting, evaluations of unfair advantage should be neutral with respect to inequalities related to effort. This explains why the overall absolute advantage measured by $IOP_p(s)$ is then averaged across the effort distribution (as indicated by the integral operator in the formulas).

The value of the index, scaled up by 100, can be interpreted as the average percentage change in the average outcome level in state s (i.e. μ_s) that can be associated with a change in the circumstances of origin from c_j to c_i .

24.2.2 Ex ante perspective

In the *ex ante* setting, evaluations are made as if effort has not been yet exerted. This is a normative standpoint rather than an empirical necessity. This means that the inequality of opportunity assessment should be based on overall evaluations of the opportunities distributions of each type at any effort levels, denoted $F_s(y|c)$. Each distribution represents the complete mapping between outcomes and responsibility. Evaluations are carried over through evaluation functions, denoted E , of the conditional distributions $F_s(y|c)$. Evaluations might incorporate efficiency (i.e. only the average size of the advantage experienced by the type should matter) and even equity (i.e. also the uncer-

tainty in the effort distribution should be taken into account) concerns about the effort distribution, which is *ex ante* unknown. The overall disadvantage in a society is captured by the *ex ante* index IOp_A . It consists in an assessment of the dispersion in evaluations across types. If the dispersion is measured by the Gini index, we obtain:

$$IOp_A(s) = GI(E(F_s(y|c_1)), \dots, E(F_s(y|c_N)))$$

We consider two specifications of this index. In the first case, evaluation is exclusively based on an efficiency argument, implying that the focus should be on the average realisations of individuals with circumstance c , denoted μ_c , so that $E(F_s(y|c)) = \mu_c$. The corresponding *ex ante* inequality of opportunity index is denoted:

$$IOp_{A1}(s) = GI(\mu_{c_1}, \dots, \mu_{c_N}) \\ = \frac{1}{2\mu_s} \sum_i \sum_j w_{c_i} \cdot w_{c_j} \cdot \left| \int_0^1 y_s(c_i, p) - y_s(c_j, p) dp \right|.$$

By definition, the integral in the second row is equivalent to $\mu_{c_i} - \mu_{c_j}$, since the area below a Pen's Parades (i.e., its integral) is an alternative way of computing the average of the outcomes generating that Parade. In this type of evaluation, positive and negative gaps in opportunities along the effort domain can exactly compensate each other.

In the second case, we consider evaluations incorporating efficiency *and* equity concerns, incorporating not only the expected realisations of a type's opportunities distribution, but also the intrinsic uncertainty about the distribution of effort. To do so, we express the evaluation as the expected value of an opportunity profile corrected by an inequality measure, which captures distributional concerns. Assuming that the inequality in each type's opportunities distribution is measured by the Gini coefficient Gl_c , the new *ex ante* inequality of opportunity indicator writes:

$$IOp_{A2}(s) = GI(\mu_{c_1} \cdot (1 - Gl_{c_1}), \dots, \mu_{c_N} \cdot (1 - Gl_{c_N})) \\ = \frac{1}{2\mu_s} \sum_i \sum_j w_{c_i} \cdot w_{c_j} \cdot \left| \int_0^1 2 \cdot (1 - p) \cdot (y_s(c_i, p) - y_s(c_j, p)) dp \right|.$$

The Gini index Gl_c can be reformulated as the integral of a Pen's Parade, distorted by a weighting function, $2 \cdot (1 - p)$, that depends on the position along the parade (for references see Zoli, 1999). In this type of evaluations, positive gaps in opportunities associated with low effort levels overweight negative gaps of equal intensity, but associated with high effort level. This is the perspective behind the *Gini Opportunity index* by Lefranc et al. (2009).

24.2.3 Comparing the two approaches

The indicators provide different perspectives about the distribution of advantage that are interesting in their own right. The comparison of these indicators is, indeed, useful to assess which dimension of advantage is driving countries' performance. The indicators have a common interpretation: they measure the expected percentage change in opportunities (income) associated with a change in the circumstances. Since circumstances are not a-priori ordered, assessments of this differential effect require a comparison of gaps across all possible pairs involved in the analysis. These gaps are estimated in a regression framework⁽¹⁹⁷⁾. Finally, note that the well-known clash between the *ex ante* and *ex post* perspectives (Fleurbaey, 2008) emerges clearly from the formulation of the indicators IOp_P and IOp_A . They essentially differ from where the absolute value, defining the extent of advantage, is placed. Unless the types can be clearly ordered by the advantage they confer, thereby giving $IOp_P = IOp_{A1}$, the indicators IOp_P and IOp_{A1} give different perspectives on the extent of inequality of opportunity. The IOp_{A2} index, instead, conveys additional information on the distributional features of the *ex ante* distributions of opportunities.

⁽¹⁹⁷⁾ To estimate the $IO_c(s)$ indices we use quantile regression within a RIF design to estimate gaps at selected deciles of the conditional distributions, and then we average these gaps according to the relative size of the type in the sample. Standard errors of our estimates are bootstrapped (see Goedemé, 2013 for bootstrap analysis on EU-SILC data).

24.3 Using EU-SILC intergenerational modules to study inequality of opportunity

We use our measurement framework to investigate the evolution of inequality of opportunity across selected EU countries. In addition to the core information collected in EU-SILC (see Chapter 2 in this book), every year ad hoc modules on specific topics are added to the cross-sectional dataset. We use the 2005 module on 'Intergenerational transmission of poverty' and the 2011 module on 'Intergenerational transmission of disadvantage' to construct between-states, cross periods, comparisons of the recent evolution of inequality of opportunity in the EU. These modules provide repeated cross-sectional information on the socioeconomic background of origin of the individuals interviewed in EU-SILC, along with standard relevant measures of labour market outcomes. In particular, they contain retrospective information about the parental background experienced by the respondents when aged between 12 and 16 (see Atkinson et al., 1983 for pros and cons of retrospective data). This unique base provides (to a large extent) comparable data allowing similar definitions for variables measuring outcome and circumstances across countries and time⁽¹⁹⁸⁾.

Our estimation sample covers 19 countries where data of interest are available both in 2005 and 2011⁽¹⁹⁹⁾. Our objective is to estimate opportunity profiles in each country from labour market outcomes. As a consequence, the focus is shifted on individuals, rather than households. To estimate opportunity profiles, we restrict attention to males aged between 30 and 50 who worked full time as an employee for at least 7 months in the

income reference period. In addition, individuals who declared that they were living in another private household, foster home, collective household or institution were excluded. All tables are based on this estimation sample. Following Raitano and Vona (2014), we use the intergenerational module weight included in both modules. In 2011, these weights are available for 16 countries. For Denmark, France and Cyprus, we substitute the missing intergenerational module weights in 2011 with the personal non-module specific weights.

24.3.1 Circumstances

The modules contain retrospective information about parents' educational attainment, occupational status, labour market activity status, family composition as well as presence of financial difficulties during respondents' teenage years. In this chapter, we focus on the educational attainment of the father as the relevant circumstance. This choice, which is in line with previous literature (e.g. Roemer, 1998 or Lefranc et al., 2008), is driven by comparability motives and by sample size requirements at the moment of estimating the unfair disadvantage distribution. As a consequence, we disregard interesting circumstances that were not present in both waves (e.g. the migration status of the parents) or whose comparability over time is not guaranteed (e.g. financial difficulties). By using paternal education we aim, nonetheless, at drawing out the effect of a circumstance which escapes individual responsibility but might explain unfair inequalities in the labour market.

To construct circumstances, individuals are first divided in three types (or groups) according to their father's education. The *high education* type consists of individuals who lived in a household where the father attained the first (e.g. bachelor, master or equivalent) or second (e.g. PhD or equivalent) stage of tertiary education; the *medium education* type consists of individuals who lived in a household where the father attained upper secondary education and post-secondary, non-tertiary education. Finally, the *low education* type consists of individuals who lived in a household where the father at most completed lower secondary education.

⁽¹⁹⁸⁾ The assessment of the implementation of each module can be found here: <http://ec.europa.eu/eurostat/web/income-and-living-conditions/data/ad-hoc-modules>; see Whelan et al., 2013 for possible limitations of the 2005 module.

⁽¹⁹⁹⁾ These countries are: Austria (AT), Belgium (BE), Cyprus (CY), Denmark, (DK), France (FR), Germany (DE), Estonia (EE), Finland (FI), Hungary (HU), Ireland (IE), Iceland (IS), Lithuania (LT), Luxembourg (LU), the Netherlands (NL), Norway (NO), Poland (PL), Sweden (SE), Slovakia (SK) and the United Kingdom (UK). The other countries were left out because they were not present in both years, did not report gross earnings in 2005 or because of other data issues.

Table 24.1: Average gross earnings by type and country, 2005 and 2011
(Purchasing Power Standard (PPS))

Country	2005				2011			
	All	High	Medium	Low	All	High	Medium	Low
Belgium	38 363	66 493	35 496	32 305	38 693	45 270	38 943	35 600
Denmark	33 253	37 810	33 851	31 065	41 770	48 700	40 558	37 749
Germany	39 142	42 081	38 409	35 727	40 160	43 920	39 571	34 104
Estonia	11 268	14 356	11 882	9 153	17 672	22 060	17 390	13 935
Ireland	36 824	41 470	68 336	31 446	44 464	54 726	46 432	38 981
France	27 205	35 618	28 954	25 592	30 807	40 700	35 729	28 636
Cyprus	26 459	32 351	31 562	24 744	32 014	34 834	35 207	30 629
Lithuania	8 813	13 268	9 100	7 746	10 630	12 844	12 185	9 077
Luxembourg	51 020	70 120	59 723	43 286	47 993	67 426	56 391	37 817
Hungary	9 945	22 108	10 427	6 922	12 715	18 918	13 918	10 857
Netherlands	40 361	48 555	44 080	37 092	47 214	51 018	49 156	43 257
Austria	32 394	39 010	35 534	29 768	39 727	48 731	40 634	34 993
Poland	11 735	16 894	12 491	10 185	16 975	24 766	17 291	14 558
Slovakia	7 371	11 391	7 277	6 408	14 374	18 364	14 042	13 512
Finland	26 592	35 366	25 168	24 385	36 364	41 078	34 242	35 158
Sweden	27 415	36 523	28 252	25 554	34 342	42 470	33 386	31 255
United Kingdom	44 324	58 673	50 498	37 726	41 626	55 472	39 974	37 751
Iceland	36 024	42 207	37 558	31 706	36 011	39 874	37 146	32 290
Norway	34 155	39 756	33 207	31 290	46 681	52 887	45 093	42 374

Reading note: In Austria in 2005, the average gross earnings of our estimation sample was 32 394 Purchasing Power Standard (PPS; see Chapters 1 and 3 in this book). For individuals who lived in a household whose father was highly (low) educated when he was between 12 and 16 it was 39 010 (29 768) PPS.

Source: Authors' computation, UDBs of August 2009 and August 2014.

24.3.2 Outcome

Our outcome variable of interest is the annual gross employee cash or near cash income. It is defined as the monetary component of the compensation in cash payable by an employer to an employee, and it includes the value of any social contributions and income taxes payable by an employee or by the employer on behalf of the employee to social insurance schemes or tax authorities. This variable reflects the relation between the labour income and individual circumstances before state intervention. Differences in earnings originating from this variable are likely to reflect the effect that paternal education has on the individual skill accumulation process, on the individual costs in exerting effort, and on equal access to all positions offered in the job market.

Two caveats apply to this particular metric of opportunities. First, this variable is defined at the level

of the individual, implying that labour supply decisions are assumed to be made at individual level, thus neglecting household bargaining issues. Second, earnings represent yearly evaluations of performances, since we focus on individuals who spent more than 6 months in the income reference period as full-time workers. The observed earnings were converted in purchasing power standard (PPS) using the conversion rates provided on the CIRCABC user group ⁽²⁰⁰⁾. Table 24.1 contains the average gross earnings by type and country. As expected, individuals with a more highly-educated father have the highest gross earnings.

⁽²⁰⁰⁾ See: <https://circabc.europa.eu/w/browse/3c60eeec-aca4-4db7-a035-0a6d892e6069>. It is also worth mentioning that the method is scale invariant, which means that we obtain the same results when analysing gross earnings in national currency or after conversion in PPS. On PPS, see also Chapters 1 and 3 in this book.

24.4 Results

In this section, we first study the patterns of the indicators discussed in Section 24.2 and applied to the EU-SILC data presented in Section 24.3. Then, we explain how these indices relate to known measures of intergenerational income elasticity. This perspective makes clear that the inequality of opportunity indicators capture components related to structural inequalities and disadvantage. Finally, we discuss how the structural component of disadvantage is related to the 'at-risk-of-poverty-or-social-exclusion' (AROPE) EU indicator.

24.4.1 Inequality of opportunity indices

As the data show, the social prestige stemming from the paternal educational status also reflects the unfair advantage or disadvantage that these circumstances are likely to generate in terms of opportunity profiles for the younger generations. This holds across all years and countries. The magnitude of these gaps, along with their variation across time, are reported in Figure 24.2. The figure also reports, for each estimate, the 95 % confidence interval based on bootstrapped resampling procedures on baseline data, where stratification by country, year and region of residence is accounted for (see Goedemé, 2013).

The top-left panel of the figure shows that there is a strong heterogeneity in inequality of opportunity (measured in the *ex post* perspective) across the 19 EU countries considered in this chapter. In 2005, we can distinguish two well-defined groups of countries. The first group, comprising the Nordic countries, as well as Germany, Austria, Belgium, France, Cyprus and the Netherlands, displays low levels of inequality of opportunity, ranging from 0.023 to 0.04. The remaining countries display higher heterogeneity in inequality of opportunity, ranging from 0.043 for Slovakia to 0.098 for Hungary. This group includes lower income EU countries, with some notable exceptions such as Finland, Luxembourg and the United Kingdom. For the last two countries, it is likely that part of the measured inequality of opportunity is driven by the high-skill premium specific to their labour market conditions,

which has probably benefitted more those coming from relatively advantaged backgrounds. In general, we conclude that these indicators are all significantly positive in the statistical sense.

We can give an easy interpretation to the extent of inequality of opportunity measured by the indicators: in Germany (the least 'opportunity unequal' country in 2005), one expects that a shift in the background circumstances generates a 2.3 % change in earnings, while the same shift would induce a 9.8 % change in earnings in Hungary (the most opportunity unequal country in 2005).

Some patterns of changes in *ex post* inequality of opportunity across the 2005-2011 period are worth mentioning. Among the least opportunity unequal countries in 2005 we generally observe an increase in inequality of opportunity, with the largest change in absolute terms being registered in Austria. Countries placed at the centre of the inequality of opportunity spectrum in 2005 generally experienced a drop in IOp_p index. These reductions have been particularly high for the Netherlands and Cyprus, becoming the least opportunity unequal countries in 2011. For the most opportunity unequal countries in 2005, the change is more heterogeneously distributed. Finland, for instance, has seen a major drop while Luxembourg has jumped to the top of the ranking in 2011, with a measured inequality of opportunity of around 0.11, which can be interpreted as 11 % of the average income. How many of these changes are statistically significant? An answer comes from the analysis of the patterns of IOp_p differences and their standard errors across the countries, reported in the bottom-right panel of Figure 24.2. As the graph shows, the 95 % confidence interval around the absolute change in inequality of opportunity contains the zero for most of the countries, detecting cases where the changes between the 2 years are not statistically significant. Relevant exceptions to the general trend are Austria, where inequality of opportunity has increased by 0.018, and Finland, where inequality of opportunity has dropped by 0.024 in 2011. Overall, we conclude that the level of *ex post* inequality of opportunity has not dramatically changed during the period considered, underlying the relevance of long term trends in this phenomenon.

Moving onto the analysis of the *ex ante* inequality of opportunity perspective embodied by the IOp_{AI}

indicator, we obtain patterns that are very closely related to what has been discussed above. The results reported in the top-right panel of the figure reflect the patterns described above, indicating that the opportunities prospects associated with the groups we are looking at can be ordered consistently at any effort level. These results confirm that the extent of inequality of opportunity we are measuring is characterised by a strong component of advantage across types, with children of more educated parents expecting more favourable opportunities, which is unchanged across the effort spectrum.

Also the bottom-left panel of the figure, reporting the distribution of IOP_{A2} indicators across countries, displays a pattern in line with the evolution of inequality of opportunity in the *ex post* setting. However, the size of inequality of opportunity is somehow lower. This finding reflects the fact that the IOP_{A2} indicator gives larger weight to the advantage/disadvantage concentrated at the bottom of the distribution of effort. Hence, the overall advantage/disadvantage between the different types must be concentrated at high levels of effort, indicating that children from families with more educated fathers receive an economic advantage in the labour market compared to children from low educated fathers, and this advantage increases along the 'comparable' effort dimension. Comparing the patterns in 2005 and 2011, we find that changes in the IOP_{A2} index reflect changes observed for the other indicators. The relevant exception is Luxembourg, where we cannot reject that *ex ante* inequality of opportunity has augmented in the period considered.

What are the drivers of these results? The answer lies on the cross-country heterogeneity in the pattern of the gaps between opportunity profiles associated with different types. These gaps are conveniently rearranged and reported with their 95 % confidence intervals in Figure 24.3. In the figure, the height of the bars represents the weighted average gap in PPS between pairs of types, where the opportunity profile of children with more educated parents is always compared with the opportunity profile of children with less educated parents. These gaps are mostly positive, aside from some cases where they are not statistically distinguishable from zero. In general, the gaps between the children from more educated parents and those

from less educated parents drive the inequality of opportunity indices, despite the relatively small size of the most advantaged type across the sample of countries considered here.

Notable cases where the gap is particularly high are Luxembourg, registering the largest gap across types, and Ireland ⁽²⁰¹⁾.

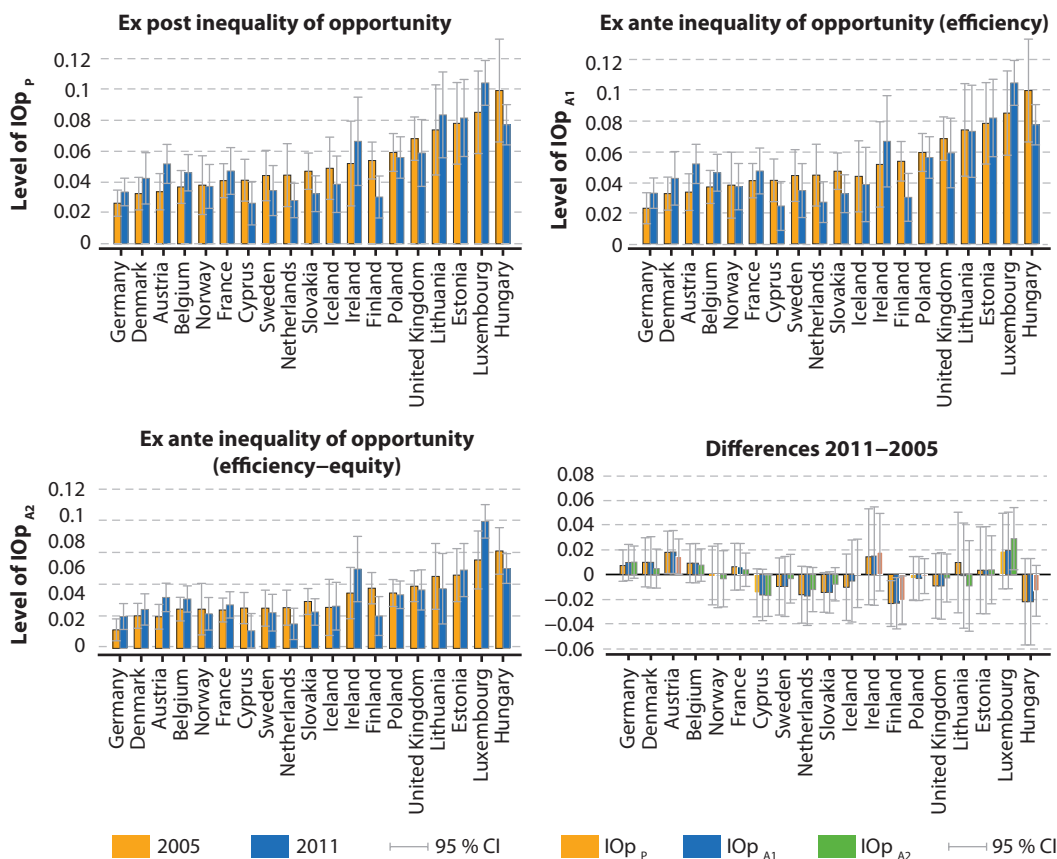
24.4.2 Inequality of opportunity and risk of poverty or social exclusion

The inequality of opportunity indicators are related to structural components of inequality that have to do with the pattern of transmission of advantage and disadvantage across generations. We support this conjecture by drawing from the literature on intergenerational father-son earnings elasticity. Reliable estimates for these elasticities, depicting the percentage change in the earnings of the son as a response to a 1 % change in paternal earnings, are practically hard to identify and measure on available data. The most reliable estimates are available for Nordic countries (see Jäntti and Jenkins, 2014).

For illustrational purposes, we focus on the case of Sweden in 2005. In the data, we find that $IOP_p = 0.038$, indicating that over the effort distribution, an increase by a category of the paternal educational standards when the child was still living with the parents is associated with a 3.8 % increase in the expected advantage this child will experience. Here, the 'change' in circumstances has a vague interpretation, since circumstances are not ordered on a-priori ground (they represent categories of parental education). However, with the appropriate metric the indicator can be associated with a measure of intergenerational elasticity. Let us approximate the expected shift of an educational circumstance by the income returns to education that fathers would have experienced over the life cycle. For Sweden, it can be safely argued that returns from education for the father's

⁽²⁰¹⁾ It is worth recalling that the indicators are standardised by the mean income of the country. Hence, despite the fact that Luxembourg displays larger advantage gaps in 2005 compared to Hungary, it also has a comparatively larger average expected earnings levels which finally smooths the evaluation of these gaps.

Figure 24.2: Inequality of opportunity indicators and their changes, 2005 and 2011



NB: The two panels at the top and the bottom-left panel report the patterns of the *ex post* and *ex ante* indicators in 2005 and 2011 for all selected countries. In these three panels, the vertical columns indicate the level of inequality of opportunity in a given country-year as measured by one of the indicators. The bottom-right panel reports, for each country, the actual changes in the indicators from 2005 to 2011. In all four panels, the grey bars indicate the 95 % confidence bands for these estimates (based on 250 bootstraps replications for stratified data). Countries are ordered by *IOP_p*, values in 2005.

Reading note (top-left panel): In Germany (least ‘opportunity unequal’ country in 2005), the 0.023 figure means that a shift in the background circumstances is expected to generate a 2.3 % change in wages.

Source: Authors’ computation, UDBs of August 2009 and August 2014.

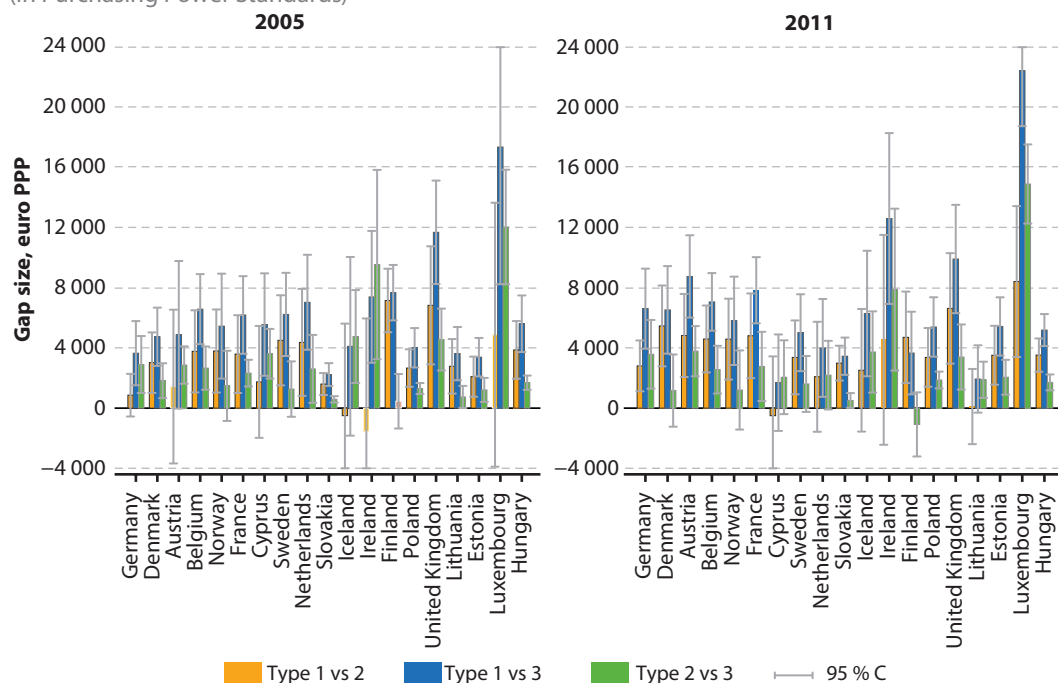
generation considered here are generally larger than 9.95 %⁽²⁰²⁾. Using these data, we can infer an

⁽²⁰²⁾ Björklund (1986) has documented a fall in the returns to schooling in Sweden from 7.8 % in 1968 to nearly 4 % in 1984. This result is confirmed by Björklund and Kjellström (2002) who show that for male worker, the returns from education estimated by the Mincer equation have shifted in the same time span from 8.7 % to 4.6 %, or from 11.2 % to 5.4 % according to the reference scenario. It is therefore reasonable to assume a 9.95 % return to education for the cohort of the parents considered in this study. Given the trend identified by the two authors, and the possibly large shift in human capital associated with a change in the circumstances we consider, this figure is likely to be a lower bound of the earning variation we are interested in.

upper bound for the earning elasticity between fathers and children earnings of nearly 0.382 (equal to 3.8 %/9.95 %), which is close to the 0.3 intergenerational elasticity estimate found by Björklund and Jäntti (1997) on 1990 earnings of Swedish male workers aged 29–38.

This simple example shows the relevance of the inequality of opportunity analysis in capturing intergenerational patterns of advantage and disadvantage, and allows approximate mobility coefficients for countries where reliable estimates of intergen-

Figure 24.3: Average weighted gaps in opportunity profiles across types, 2005 and 2011
(in Purchasing Power Standards)

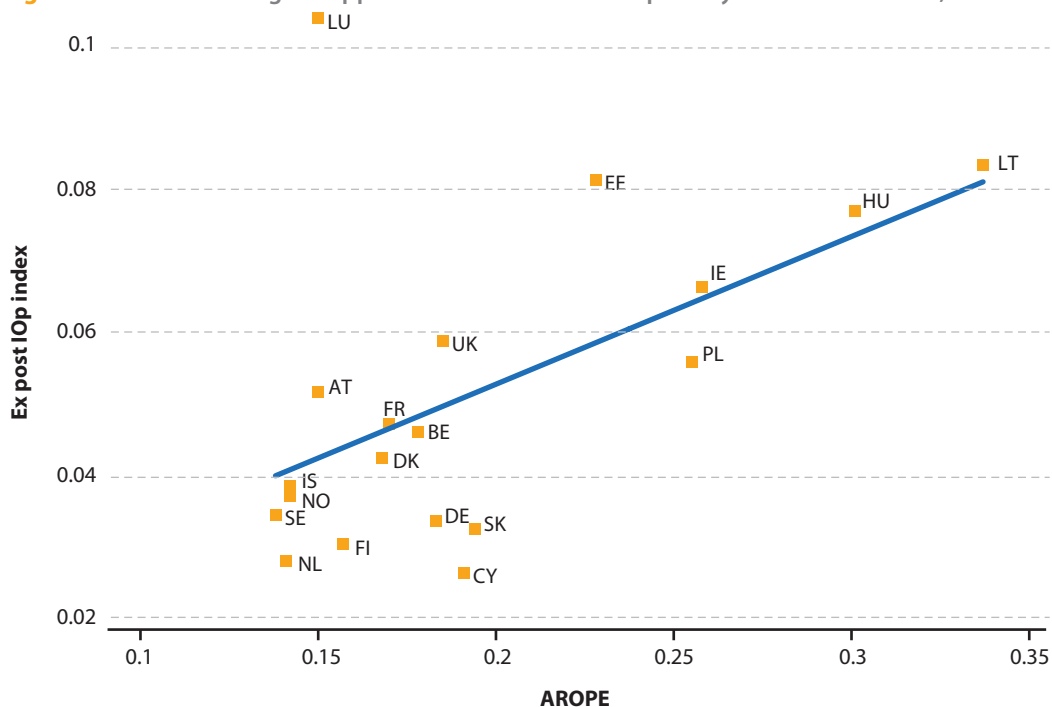


Reading note: Each panel reports, for each country in a given year, the weighted average gap between the opportunity profiles of pairs of types (high, low and medium educated fathers), or a total of three comparisons per country. The grey bars indicate the 95% confidence bands for these estimates (based on 250 bootstraps replications for stratified data). Values trimmed at 24 000 and -4 000 PPS. Countries ranked as in Figure 24.2.

Source: Authors' computation, UDBs of August 2009 and August 2014.

erational elasticities are not available. Within this perspective, it is interesting to understand how the intergenerational dimension of disadvantage is related to the actual extent of disadvantage. Figure 24.4 provides some hints on this. The figure scatters the 19 countries considered in this study, where the level of *ex post* inequality of opportunity measured in 2011 is confronted with the realisations of the EU indicator of 'at-risk-of-poverty-or-social-exclusion (ARPE) for the male population aged 25-49. The figure provides evidence on two stylised facts. First, that there is a positive association between short-term disadvantage, as captured by the ARPE index, and long-term disadvantage, as captured by IOp_p . Hence, countries promoting labour market policies targeting the ARPE indicator have good chances of reducing the process of intergenerational persistence of disadvantage. The second fact is that, even among countries with very low levels and

stable patterns of actual disadvantage, there is high heterogeneity in intergenerational disadvantage. This indicates that despite similar level of poverty or social exclusion, the policies targeting intergenerational disadvantage may affect the channels through which disadvantage passes across generations. This can be done, for instance by fostering participation in the educational system or, as suggested by recent evidence in Andreoli et al. (2014), by shaping universal pre-schooling programmes to provide uniform high quality pre-primary education to all children, while targeting with additional support those children with the most disadvantaged background who are most unlikely to thrive in the labour market. This form of *predistribution* taking place early in life would contribute to promoting a fair distribution of resources later on, alongside yielding efficiency gains if the disadvantaged children are those with

Figure 24.4: Disadvantage in opportunities and the risk of poverty or social exclusion, 2011

Reading note: The AROPE index is based on male population aged 25-49 in 2011. The OLS estimates of the fitted regression line coefficients (SE) are 0.011 (0.015) for the intercept and 0.207 (0.078) for the slope.

Source: Authors' computation, UDBs of August 2009 and August 2014. The AROPE indicator for selected countries is available from the Eurostat web-database (code *ilc_peps01*). Data extracted on 24.9.2014.

larger potential to develop additional skills that are valuable in the labour market ⁽²⁰³⁾.

24.5 Conclusions

The purpose of this chapter was twofold. First, to propose a novel way of quantifying the degree of inequality of opportunity through simple indicators, which are consistent with the normative perspectives on EOp. Secondly, to illustrate this measurement framework by investigating the evolution of inequality of opportunity across a selection of European

countries between 2005 and 2011. Our analysis suggests that there have been no statistically significant changes in inequality of opportunity across the 19 EU countries considered in the study. There are exceptions, and the change seems to be driven from variations in the gap between opportunity profiles of the more and the least advantage 'types' (a type gathers all individuals who share similar characteristics for which they cannot be held responsible for, such as paternal education). While these results probably reflect the differentiated effect of the recent crisis on each country's labour market (our analysis focuses on gross earnings, i.e. before taxes and transfers) and the measures that have been proposed to mitigate its effects though incentives to the labour market, explaining the causes of this evolution will require further research and analysis (e.g. focusing on household net income).

⁽²⁰³⁾ A synthetic overview of mechanism transforming predistribution of skills into redistribution of wealth can be found in J.J. Heckman's post on the Boston Review: <http://www.bostonreview.net/forum/promoting-social-mobility-james-heckman> (Accessed: 10 March 2016).

While the EU-SILC 2005 and 2011 modules constitute the best available data to answer our research question, some comparability issues across countries and time constrained us to reduce the scope of our analysis to countries which collected both waves and with similar income and circumstances (father's education) data. Indeed, the 2011 module is an improved version of the 2005 module taking into account pitfalls of the initial module highlighted by the assessment of the 2005 module (see also Whelan et al., 2013 for issues related to the 2005 module). These improvements increase the quality of the 2011 data but affect the comparisons of the results drawn from both modules. For example, the possibility for respondents to answer 'don't know' to a wide range of questions in 2011 (an option that was not given to the respondent in the 2005 questionnaire) may affect the comparisons of the results drawn from the two modules in ways that are difficult to assess.

In addition, as already mentioned, the two EU-SILC modules are examples of retrospective questions that ask 'present-day respondents about past history' (Atkinson et al., 1983, p. 17). Respondents are asked about their parents' past characteristics. This type of survey is appealing as it allows the study of intergenerational issues without actually having to wait for two generations. The validity of the data is, however, crucial and rests on the ability of each respondent to provide accurate answers about their parents' characteristics. To our knowledge, no external validity test of the retrospective modules present in EU-SILC has been undertaken. In order to do so, confronting EU-SILC module data with official records in register countries, or encouraging the researchers community to engage in meta-analysis, such as the one we performed by comparing inequality of opportunity indicators with results from the literature on intergenerational earnings elasticity, may be a strategy worth exploring further.

Finally, while our results depend on elements such as the choice of the outcome variable and the circumstances or, as already mentioned, the validity of the retrospective modules, they provide a new perspective on the distribution of well-being which can usefully complement the Europe 2020 social inclusion target. Indeed, the inequality of opportunity indicators are positively associated with actual measures of disadvantage and social exclusion, such as the AROPE

indicator. However, this correlation is not perfect and the inequality of opportunity indicators seem to capture some underlying heterogeneity among countries with very low and similar levels of social exclusion. This perspective highlights that the inequality of opportunity analysis is relevant in its own right, and that introducing inequality of opportunity indicators in the toolkit of the European social policymaker will foster the knowledge of the patterns of intergenerational persistence of inequality across the EU.

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