István György Tóth and Ábel Csathó[1]: What we brought with us and what we achieved. Decomposition of income inequality in 27 European countries by social origin and other factors[2]

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1. Introduction and research questions

The relationship of a person's income to his/her family background receives much attention in debates about the inclusiveness and efficiency of our societies. A strong association in income/wealth/social position/class among parents and children signals a closed, immobile society, while a weak or non-existent correlation of income/wealth/class/education between family members signals significant level of intergenerational mobility. In our paper we analyse how parental background influences financial achievements of the offspring in 27 European countries. The paper is at the intersection of two research traditions. On the one hand, it relies on inequality of opportunity (IOP) research, while, on the other hand, it also relates to mobility research. IOP measures usually aim to show the extent to which circumstances (and efforts) determine the achievements in various countries (Ferreira & Gignoux, 2011; Ferreira & Peragine, 2016; Checchi et al., 2010; Stuhler, 2018, Carranza, 2021; Andreoli et el., 2021, Filauro et al 2023). Despite the methodological differences applied (variable selection, ex ante or ex post approaches, lower bound or upper bound measures), one may observe a considerable consistency across studies on cross country differentials in IOP. Inequalities of opportunity tend to be the highest in the Southern tier and also in a section of the post-socialist countries. Worst IOP figures (showing strong parental influence on getting ahead in life) are shown in Bulgaria and Romania, but also in Poland, Greece, Italy, Portugal, Spain, Croatia and Serbia. Opportunities are usually shown to be most equal in the Nordic countries, such as Sweden, Norway, Iceland or Denmark, and in some Western and Central European countries, such as Austria, Germany, Switzerland and the Netherlands (Andreoli et el., 2021; Carranza, 2021).

Mobility research shows somewhat different picture depending on how social mobility is measured. While, similarly to the findings of inequality of opportunity research, intergenerational income mobility is shown to be the highest in Nordic countries, while a group of Continental countries like Luxembourg, Germany, France, and Austria, and also Hungary seems to be the least fluid in Europe (OECD, 2018:195). Bukodi and Goldthorpe, based on class mobility analysis, show the Western- and Northern-European countries (and a group of post-communist countries) to be the most fluid while, in their analyses, low fluidity

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can be experienced in Western-Central, in the Southern, and in some other post-communist countries (Bukodi and Goldthorpe 2018, 2020). As for the educational mobility, there are no clear tendencies in the order of countries, although the ends of the lists are a bit more crystallized. After the crisis, upwards mobility is the lowest in Germany, Portugal, Hungary, and Switzerland, and is the highest in Ireland, Poland, Belgium and in the Netherlands (Róbert, 2019).

In our research we try to answer the following research questions.

- Firstly, we explore, with the use of the EU-SILC dataset what differences we can detect across European countries by the effect of parental origin on incomes. In this phase we also try to contrast our results to other findings presented in the literature.
- Secondly, we present a specific analysis of how the effect of parental origin differs by income ranks in the distribution.
- Thirdly, we analyse what macro factors can be associated to the cross-country differentials in levels and patterns of parental effects.

The rest of the paper is organised as follows. First, we present our data sources and introduce our methods (Section 2). Section 3 is devoted to empirical findings. We analyse how parental education and childhood financial situation contribute to the inequalities in achievements (Section 3.1), followed by analysis of mobility chances at various income distribution cut points (Section 3.2). Then (in section 3.3) we contrast our mobility indicators to various macro (contextual) variables to get a step closer to the whys of the cross-national differences. Finally, after discussion of our results (in section 4) we conclude (in section 5).

2. Data and methods

2.1. Data

We use the 2019 database of the European Union Statistics on Income and Living Conditions (EU-SILC[3]) which covers more than 600 thousand European citizens in 200 thousand households in each EU-country complemented by Norway, Switzerland, and Serbia[4]. The usefulness of the database comes from the fact that it contains in each year detailed individual and household level income data which we use as outcome variable and, besides the usual variables on individual characteristics like age, gender, highest level of education, etc., the 2019 database also provides us with information about the respondents' parental background and living standards in their childhood[5]. This makes it possible for us to create measures for the association between the respondents' origins and (financial) achievement. A constraint of the database is that information on parental and childhood situation (placed in the

[3] Eurostat contract #: RPP340-2022-EU-SILC Microdata-17522

[4] A very comprehensive and concise introduction to EU-SILC can be found at Wirth. H. & Pforr, K. (2022).

[5] Most variables we use for measuring parental origin come from the question block on „Intergenerational transmission of disadvantages, household composition, and evolution of income" that is a third bloc (after 2005 and 2011) designed to provide measures for the study on intergenerational mobility (see for more: Wirth and Pforr, 2022).

intergenerational transmission-block) is only available for individuals in the 25-59 years age-bracket and thus our analysis applies to this age-group only.

Country coverage and specificities. An important specificity comes from the fact that the letter "S" in SILC stands for "*statistics"*, rather than for, as often quoted, "*survey*: the ex post harmonized variables in the database come partly from "survey countries", where all 15+ individuals in the household were interviewed, and "register countries", where at least part of data is drawn from registers. In the latter case, mostly „hard" data like incomes, employment, etc. come from administrative databases, while „soft" variables like attitudes and personal information were drawn from personal interviews with a selected respondent of the household. Switzerland, Czech Republic, Denmark, Finland, Ireland, Lithuania, Latvia, Malta, Netherland, Norway, Sweden, and Slovenia use some kind of combination of register and survey data, from which in Denmark, Finland, Netherlands, Norway, Sweden, and Slovenia, the detailed personal data is coming from „selected respondent[6]". This latter feature is very important for the use of the intergenerational transmission data, since in register countries the selected respondent is the sample person, who might be, but not necessarily is the household respondent.

For various reasons, we had to exclude some European countries from our analysis. Malta only provides grouped age information. For Slovenia, the variable on the degree of urbanization at age of 14 variable is missing. In France, the variance of our explained variable was found to be unrealistically low (independent from the methods we used for the variance decompositions) and we could find neither substantive nor technical explanation for this. Apart from these, for Hungary, we found uncertainties for the 2019 income data, which may strongly influence the results. We did not exclude the 2019 data for Hungary, but we also included the 2011 data, which contains almost the same kind of parental background information.

Left hand variable: income When we explore mobility and inequality of opportunity, our key left-hand variable is equivalized net household income, where we – using the Eurostat specifications – define household as a person living alone or a group of persons living together in the same private dwelling, sharing expenses, and providing jointly for living essentials. To account for household economies of scale, OECD modified scale is used, which gives a weight of 1.0 to the first person aged 14 or more, a weight of 0.5 to other persons aged 14 or more and a weight of 0.3 to persons aged 0-13.

Using equivalized household income is the second-best alternative, as it only reflects current income (yearly, though) that may not reflect social structural positions. However, we need to live with this as there are no better good proxies available in EU-SILC for a more robust indications of well-being reflecting accumulated reserves, such as savings and wealth of the households.

Another characteristic of the household income data is that this value is attached to all household members, regardless of their contributions to the production of the income the household has. It also means that the same value is attached to all members of the household, whose personal characteristics are different. This may produce a tendency towards a downward bias of parental effect on the offspring's material positions.

[6] The definition of „selected respondent" varies a bit, making the analysis of EU-SILC as sample of individuals in some cases prohibitively difficult (see Wirth. and Pforr, 2022).

In a part of our analysis, we use income categories, namely deciles, instead of the original continuous variable. Given the nature of income distributions, the two extreme deciles have the highest internal variance, while within group variance is much smaller in all the interim deciles. It means that applying equal population cut points will overestimate real differences between middle income groups and it may also suppress real differences in the bottom and (most importantly) in the two deciles. This could be refined by median% brackets. However, for better comparability across countries, we decided to use decile distributions and keep equal intervals by population for this analysis.

Right-hand variables[7]: The literature on equality of opportunity differentiates between *"circumstances"* (factors that are beyond the scope of individual responsibility, such as gender, race, place of birth or socioeconomic characteristics) and *„efforts"* (that, representing a series of personal or family decisions, convert more directly into material positions of the offspring). Among "circumstances" we further differentiate between *childhood demographic circumstances* (age, gender, number of missing parents, number of children at age of 14, degree of urbanization at age of 14) on the one hand and *parental background circumstances* (parental education, financial situation in childhood) on the other hand. For the "efforts" category we classify educational attainment and type of employment for the purpose of this analysis.

There are also some constraints to the use of our right-hand variables.

Firstly, the value of the parental education variable depends heavily on how the respondent could recall their parents' education during the interview. We obviously cannot do much about it, but we need to keep this in mind throughout the analysis. To minimize information losses due to selectively available variables for father's or mother's education, we used a combined parental education variable, where we considered the educational level of the parent who had higher level of attainment, or in case of missing information, the educational level of the parent for whom the educational level is known. Despite our aspiration to keep the share of missing data at parental education as low as possible, there are large cross-country variations, with considerably high share of missing values in some of the countries. In non-register countries, this share ranges from 3% to 24%, while in register countries, it ranges from 50% to 62%, which may imply biases in our results for the latter country grouping. We cannot judge if this bias is systematic or not. What we see, is that – based on available data in SILC – highest is the share of high-educated parents in Sweden (44%), Denmark (40%), and in Norway (40%), while the lowest is it in Romania (6%), Portugal (7%), and Italy (9%).

Secondly, the question on parental material situation requests thinking back to times when the respondent was 14 years old, hence the responses are retrospective AND subjective at the same time. This makes the value of this variable uncertain since retrospective evaluations of the material circumstances of family at childhood may be seriously distorted by reference groups in adulthood. The extent of the bias this may introduce in cross country comparisons is completely unknown. We hope that the recoding of this variable into four categories (thus merging the two bottom and two top categories) lowers the risk of distortions. The number

[7] The structure and definitions of explaining variables used are summarized in Table A1 in the Annex.

of missing values for the financial situation ranges across countries similarly to parental education[8].

Thirdly, for own education attainment, we were unable to unfold instances of very strange ISCED coding in the 2019 EU-SILC database. In general, it was impossible for us to differentiate between vocational school and high school leaving exam (they seemed to be coded in an inconsequential way), and thus, we categorized highest level of education as the following: ISCED 1, 2; ISCED 3,4; ISCED 5, 6, 7, 8. The availability of this (recoded) variable is high, the share of missing values is everywhere under 5%. In face of that, its variance is high, Western and Northern countries tend to have considerably higher share of population with tertiary education degree than Eastern and Southern countries have. Especially low is the proportion of higher educated people in Romania (18%), Serbia (20%), and Hungary (20%), while the highest is in Ireland (57%), Norway (51%), and Sweden (51%).

Fourthly, a variable on current labour market position of the respondents, we combined basic activity status and status in employment, and we defined inactive, self-employed, and employee people. Here, the number of missing values is negligible, 0% in most cases, 1-2% in some countries. The share of inactive people ranges from 8% (Sweden) to 19% (Ireland). The share of employees is usually around 70-80%, although in Greece it is only 58%, and in Romania 65%. The self-employed can be found in highest share in Greece (25%), Finland (21%) and Italy (19%), while it is considerably lower in Luxembourg (4%), Germany (5%), and Hungary (6%).

Beside the main right-hand variables, we used age in five-year categories, gender in two categories, number of children at age of 14 in three categories (1, 2-3, more than three)[9], number of missing parents in three categories (0, 1, and 2), and degree of urbanization at age of 14 in three categories (less than 10,000 people/settlement, 10,000-100,000 people/settlement, more than 100,000 people/settlement).

Macro variables: In section 5, we use a range of macro indicators, with which we try to associate the estimated role of circumstances in material positions. These macro indicators include GDP per capita in Purchasing Power Standards and the rate of economic activity as macro-economic variables. For inequality measures, we applied two indices: Gini, and the share of mean income of the top 10% compared to the bottom 40%. Education attainment structure is proxied by the proportion of people in the 25-64 age group with a highest level of education that is not higher than 2 on the ISCED scale on the one hand , and the proportion of those who attained at least the 5th level of ISCED scale (that is, they have higher educational degree). For class composition, we used the theoretical frames and the computations for 2018 of Goedemé, Paskov and Nolan (2021). From this, we used the share of people in the three lowest classes (routine occupations, skilled workers and lower white-collar employees). The rule of law, corruption and voice scores come from World Bank's Worldwide Governance Indicators database[10]. They are computed by citizen and expert surveys, their measurement unit are standard normal distribution units, they range approximately from -2.5 to 2.5.

[8] However, the example of Austria and Bulgaria represents perfectly, why subjective financial situation may be misleading: while in Austria, 35% of the respondents reported themselves in the top category and 13% in the bottom one, in Bulgaria 39% categorized themselves in the top category, and 5% in the bottom category.

[9] Number of children when the respondent was 14 is top-coded in Germany at 7.

[10] https://info.worldbank.org/governance/wgi/

For GDP, activity rates of the 15-64 years old age group and for the aggregated level of education, we used Eurostat data. Where it was applicable, we took information from different periods (2019, and 2000). In case of Hungary, instead of the 2019 data, we used everywhere the 2011 data (except from the class composition).

2.2. Methods

Analysis of variances: adjusted R^2 and inequality decompositions As a first step, we explore explained variances of income by various circumstances and efforts. Then, we apply regression-based inequality decompositions to determine the relative strength of the explaining categories.

For the analysis we assume that

$$Y = \beta_0 + \beta_1 C + \beta_2 P + \beta_3 E + \beta_4 S + \varepsilon \quad (1)$$

where Y is for person equivalent incomes, C is for childhood demographic circumstances, P is for parental background circumstances variables, E is for efforts, S for other elements of social structural circumstances and ε is for the residuum. However, we need to take into account that the "full" equation should be formulated like this:

$$Y = \beta_0 + \beta_{11} C_{obs} + \beta_{12} C_{unobs} + \beta_{21} P_{obs} + \beta_{22} P_{unobs} + \beta_{31} E_{obs}\, \beta_{32} E_{unobs} + \beta_4 S + \varepsilon \quad (2)$$

referring to the fact that we can measure the share of variances explained by observed factors (that are, via our variables, enter into the models) only. Therefore, the parameter estimates for the size and direction of the partial correlations (represented by β_{11}, β_{21}, and β_{31}) will lead us to part of the story only. The unexplained part of the variances will come as a sum of the variances theoretically explained by unobserved childhood demographic circumstances, the unobserved parental background circumstances and the unobserved effects of those efforts that are not measured by our variables, in addition to the other structural/institutional factors and the still remaining residuals.

First, we observe the adjusted R^2 values of models built up with gradual step-in of childhood demographic circumstances, parental background circumstances and efforts. Therefore, in the full models, we investigate how adjusted R^2 (i.e. a combined effect of C_{obs}, P_{obs}, and E_{obs}) relates to the total variance of Y. In partial models we try to identify the variance explained by circumstances and efforts separately. The above seems trivial. However, it is always useful to keep in mind how little can we expect from these specifications.

In what follows – for the sake of simplicity – we ignore the unobserved explaining variables and assume that the effects of all these appear in the residuals.

Inequality decompositions For the Cowell-Fiorio-Jenkins regression-based inequality decomposition (Cowell and Fiorio, 2011; Fiorio and Jenkins, 2008) we start from the following formulas:

$$(1)\ Y_{ij} = \beta_0 + (\beta_1 C_1 + \beta_2 C_2 + \ldots + \beta_k C_k) + (\beta_{k+1} P_1 + \beta_{k+2} P_2 + \ldots + \beta_l P_l) + \beta_{l+1} E + \beta_{l+2} S + \varepsilon \quad (3)$$

$$\mathrm{Var}(Y_{ij}) = \beta_0 + \sum Z_{i=1\ldots k} + \sum Z_{i=k+1\ldots l} \ldots + \varepsilon\,, \quad (4)$$

where $Z_i = \beta_i C_i$ where i=1,2,… l.

Based on this specification, variance of incomes can be expressed in percentage of the contribution of various factors. Z_i values represent the effect of the various individual RH variables (sex, age, number of siblings, parental education, etc..). Groups of expressions in brackets (like $\sum Z_{i=1\ldots k}$) stand for bigger classes like childhood demographic circumstances, parental background circumstances and efforts. Important to note that the procedure is not sensitive to the specific inequality measure and that contribution of the components of inequality is given by the Z_k members.

Getting ahead – analysis of determinants inside the distribution In the core of our paper is an analysis of what happens inside the distribution (of equivalized household) income. We analyse cross country differences of odds ratios for parental education at various decile cut points, controlled for childhood demographic circumstances and parental financial situation. A graphical presentation of coefficients allows us to analyse and interpret cross national differences in how parental education exert influence at various ranks of the distribution.

The specification of the logistics regressions runs like this:

$$\text{Prob(event)} = 1/(1+ e^{-Z}),$$

where e is the base for natural logarithm (cca 2,718), Z is the linear combination of variables included in the models in the following form:

$$Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k,$$

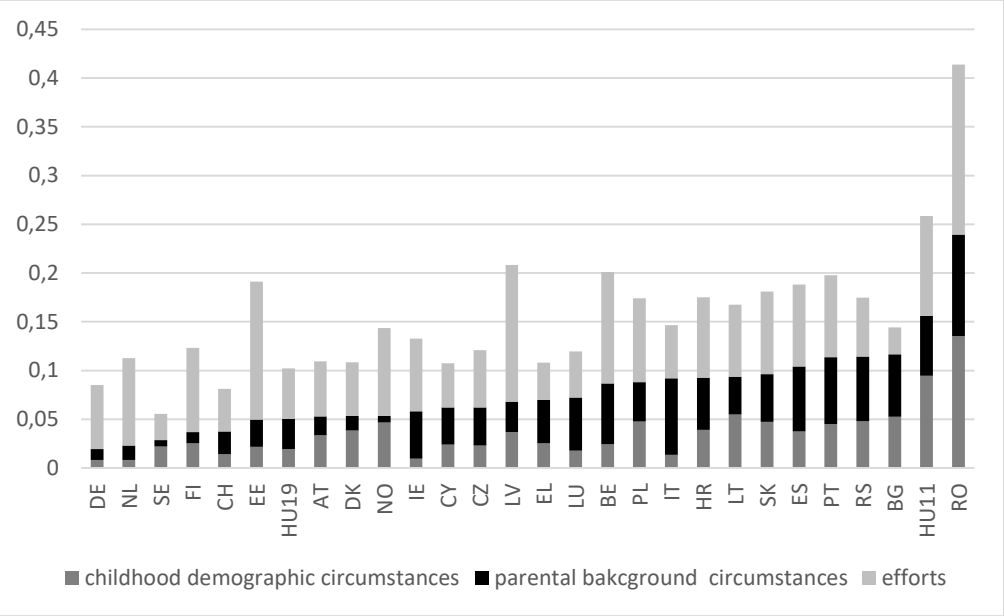
where X_1, X_2, ... X_k are independent (right hand) variables, β_0 constant, β_0, ... β_0, are parameter estimates of the individual independent variables. For „event" we define getting to the first, then the first two, three, etc. deciles, contrasted to the rest of the deciles. We estimate the exp(B) or the odds ratio, what is the predicted change in odds for a unit increase in the predictor. When Exp(B) is less than 1, increasing values of the variable correspond to decreasing odds of the event's occurrence. Results are presented only for parental education (as described above), controlled for all other variables (as described above).

3. Results

3.1. Contribution of parental education and childhood financial situation to inequalities in achievements.

First, we observe the contribution of each variable group to the total R^2, that is, to the total explained variance. Results are shown in Figure 1.

Figure 1. Explained variance of household equivalized income by childhood demographic circumstances, parental background circumstances and efforts in 28 European countries, 2019, %



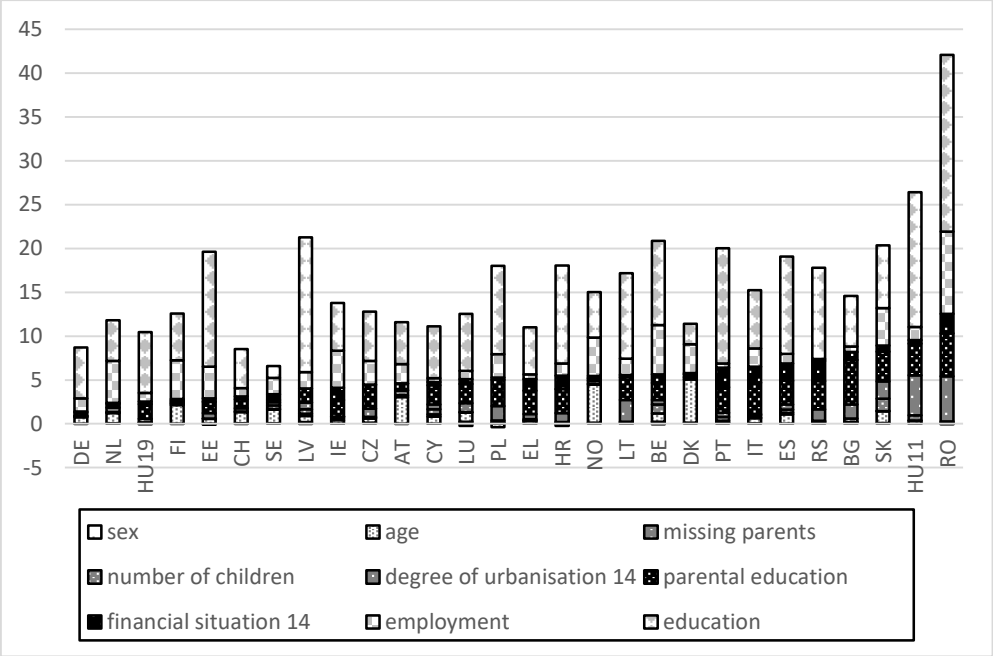
Source: EU SILC, own calculations

We ordered our graph according to the explained variance by those factors that are beyond the control of individuals (childhood circumstances and parental background combined). In general, it can be seen that the effect of circumstances variables tends to be higher in the Southern and Eastern countries. Strongest is the influence of these variables in Romania, Hungary '11, Bulgaria, Serbia, Portugal and Spain (childhood and parental circumstances account for more than 10 percent of the variance of incomes in these countries). The countries, in which the sum of explained R^2 of the circumstances variables is the lowest are Germany, Netherlands, Sweden, Finland and Switzerland and Estonia (with explained variance less than 5 percent). The rest of the countries are in between[11].

For a somewhat more detailed picture see Figure 2, which shows the details of the regression-based inequality decomposition results.

[11] However, it is important to note that, as we indicated above, there are uncertainties around the 2019 data in Hungary, thus, we also represented the 2011 data of this country, which shows a completely different picture of Hungary.

Figure 2. Proportionate contribution of various factors to inequality in 28 European countries in 2019 (in %s)



Source: EU SILC, own calculations

It shows a very similar (though not identical) picture as the R^2 analysis do. The highest effect of circumstances variables is shown in Romania, Hungary '11, Slovakia, Bulgaria and Bulgaria (showing a 8 percent share of explained variance by regression based inequality decompositions), while the least (lower than 4 percent) is the impact of childhood demographic and parental background circumstances in Germany, Netherlands, Hungary '19[12], Finland, Estonia, Switzerland and Sweden.

If we regard for the variables one by one, we can see, that sex is not shown to have effect on inequalities measured this way. It is not surprising, since we talk about person equivalent household incomes, that have a tendency to neutralize "real" income differences within the households. In face of that, the impact of age is relatively high, especially in some Northern and Western countries, where other types of circumstances variables show a lower influence. Denmark and Norway are the most striking examples for this, but it is also apparent in Austria and Finland. In other countries, where other circumstances variables are shown to have a higher influence, the effect of age is low. As for the composition of households, while the number of missing parents is hardly detectable, the number of children at age of 14 plays a more significant role in shaping inequalities, especially in Slovakia, Luxembourg, and Belgium. From the two parental background circumstances variables, parental education seems to be the stronger factor in comparison to parental financial situation in childhood. The impact of the former is the strongest in Bulgaria, Romania, Hungary '11, Italy, Slovakia, Serbia, and Poland, and weakest is in Denmark, Norway, Finland and Sweden, the latter is especially strong

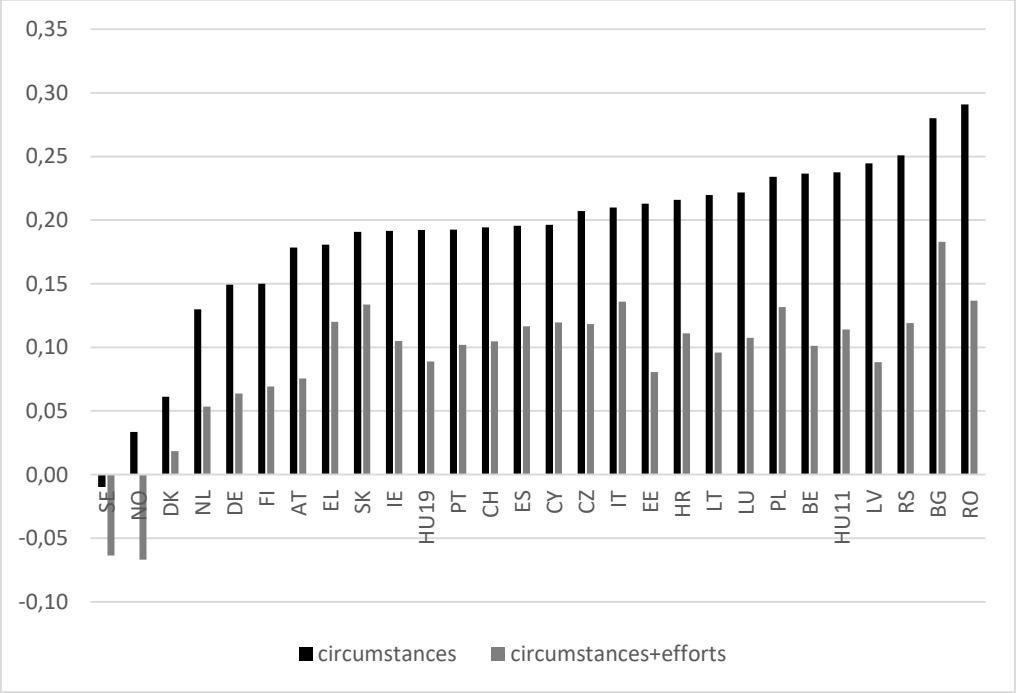
[12] The distance between the two Hungarian datapoints is puzzling. On the one hand, a detailed analysis of the income variables in the Hungarian SILC dataset leaves a large room for the reason of worry regarding data quality. On the other hand, we cannot exclude societal changes as a major factor behind the differences. The problem is that we are not able decide to what extent do we see change and to what extent it is a statistical error.

in Serbia, Portugal, Romania, Spain, Italy, and Croatia. and especially weak in Latvia, Austria, Czech Republic, Denmark, Netherlands, and Finland.

When it comes to the efforts, the impact of own education is especially high in Romania, Hungary ’11, Latvia, Estonia, Portugal, Croatia, and Spain, and low in Sweden, Denmark, Switzerland, Netherlands, and Austria, while the effect of the type of employment is relatively strong in Romania, Belgium, Netherlands, Finland, Norway, Slovakia, and Ireland.

Now we concentrate on the effect of parental education. The black bars of Figure 3 show standardized beta values for parental education (taking low educated parents as reference) controlled for all the circumstances variables, while the grey lines indicate the parameter estimates also controlled for the efforts[13]. The results are ranked by size of coefficients for parental higher education, controlled by circumstances variables only.

Figure 3. Effect of parental higher education on incomes (ref= low education), controlled by circumstances and by circumstances + efforts, 2019



Source: EU-SIL 2019, own calculations

Note: the figure is ranked by size of coefficients for parental higher education, controlled by origin variables only.

Beta for high parental education (when controlled only for childhood circumstances) is the highest in Romania, Bulgaria, Serbia, Lativa, Hungary ’11, Belgium, and Poland. In face of that, in Sweden, Norway, the difference is not even significant. But it is also very low in Denmark, Netherlands, Germany and Finland. If we control also for effort variables, the values are reduced considerably, but do not disappear. It means that parental education exerts it effect on income also over the higher education of the children. This value is the highest in Bulgaria,

[13] Results for the effect of higher educated parents and also for middle educated parents (taking low education as a reference) are also shown in Table A2.

Romania, Italy, Slovakia, Poland, Greece, Cyprus, Serbia, Czech Republic, and Spain, while it is the lowest in Norway, Sweden, Denmark, Netherlands, Germany, and Finland.

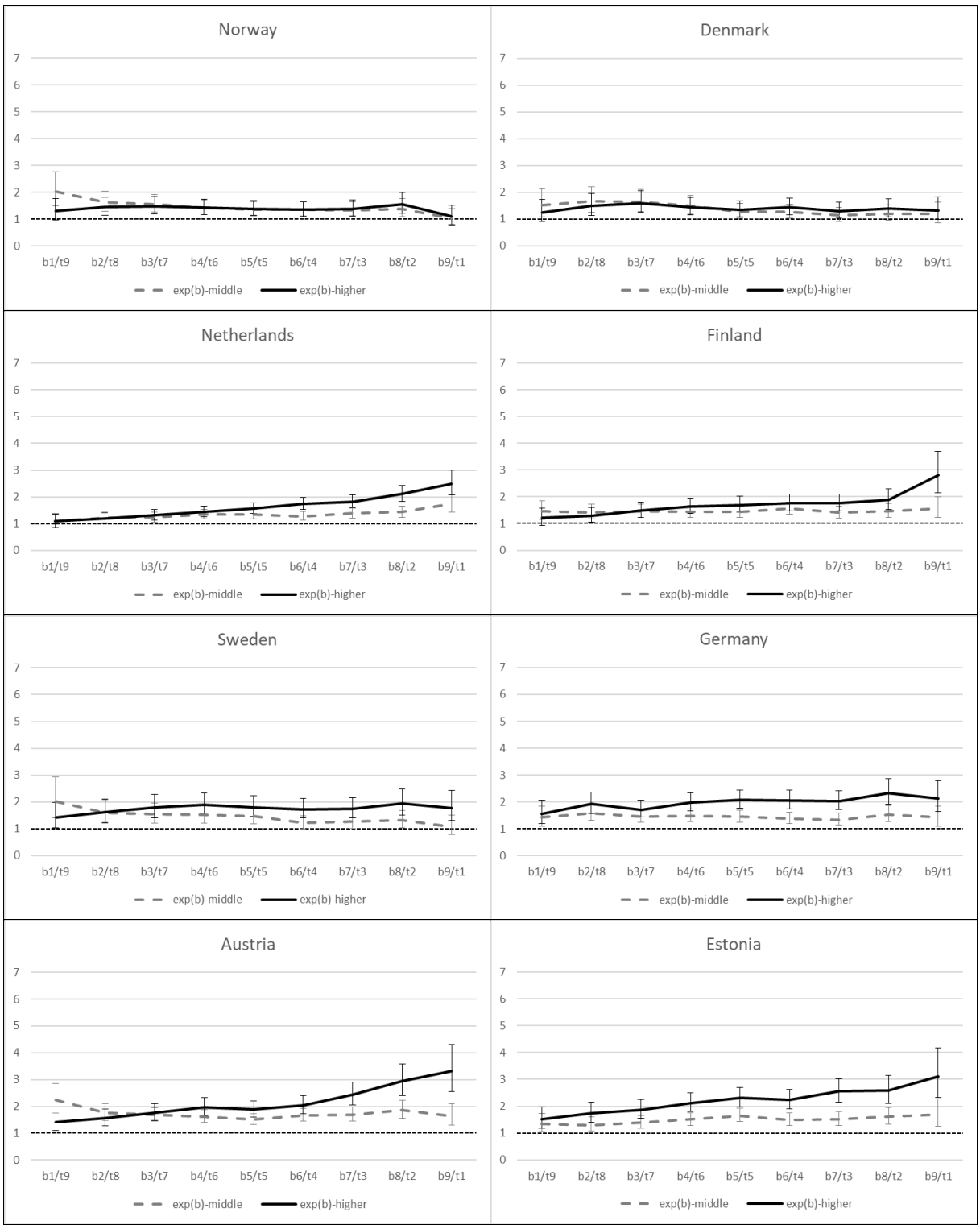
The picture is similar when the middle-educated parents are compared to the lower educated ones (see Table A2). It is also seen that the inclusion of personal characteristics reduced in most cases the effect of parental education considerably (but not completely).

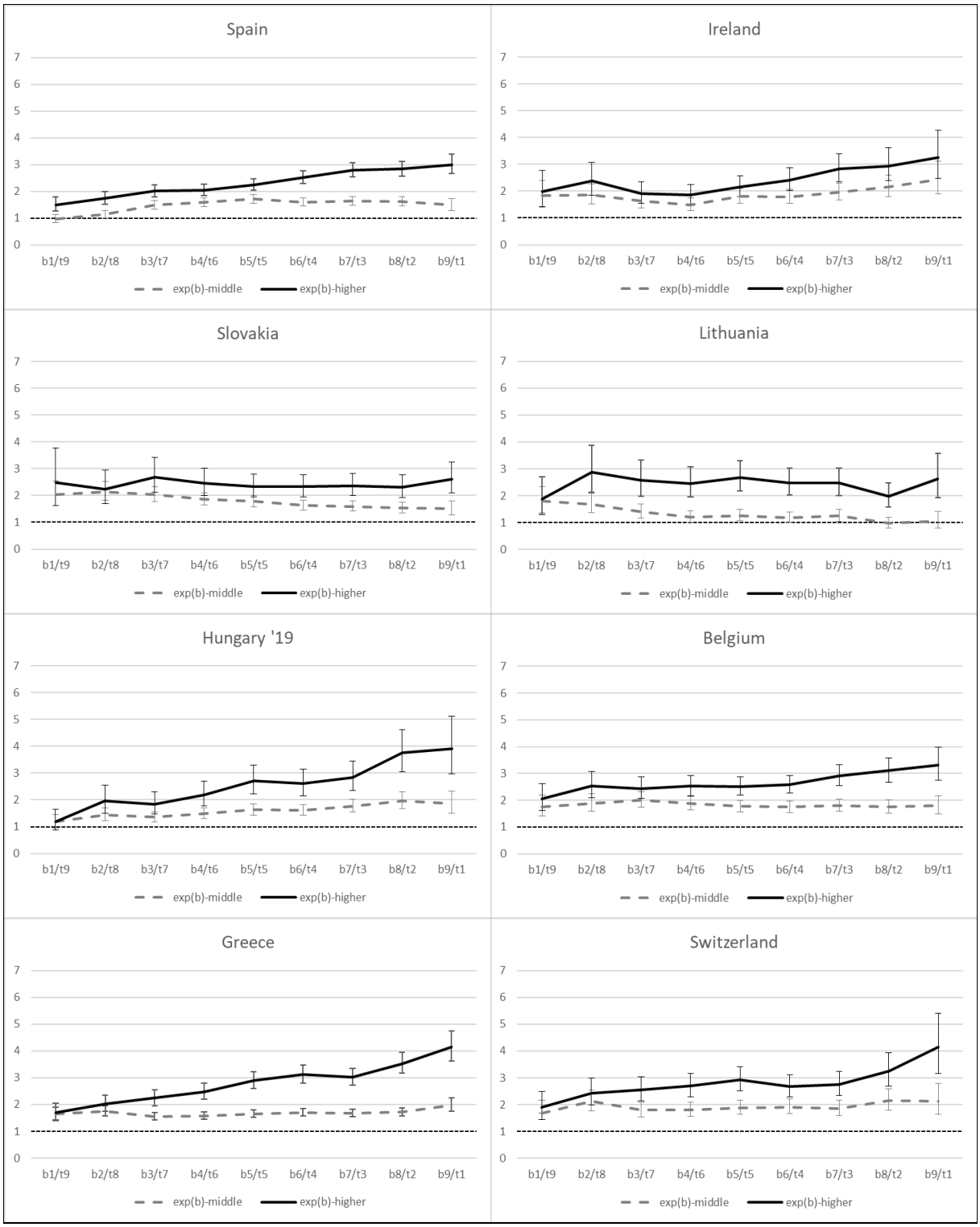
3.2. Analysis of mobility chances at various income distribution cut points

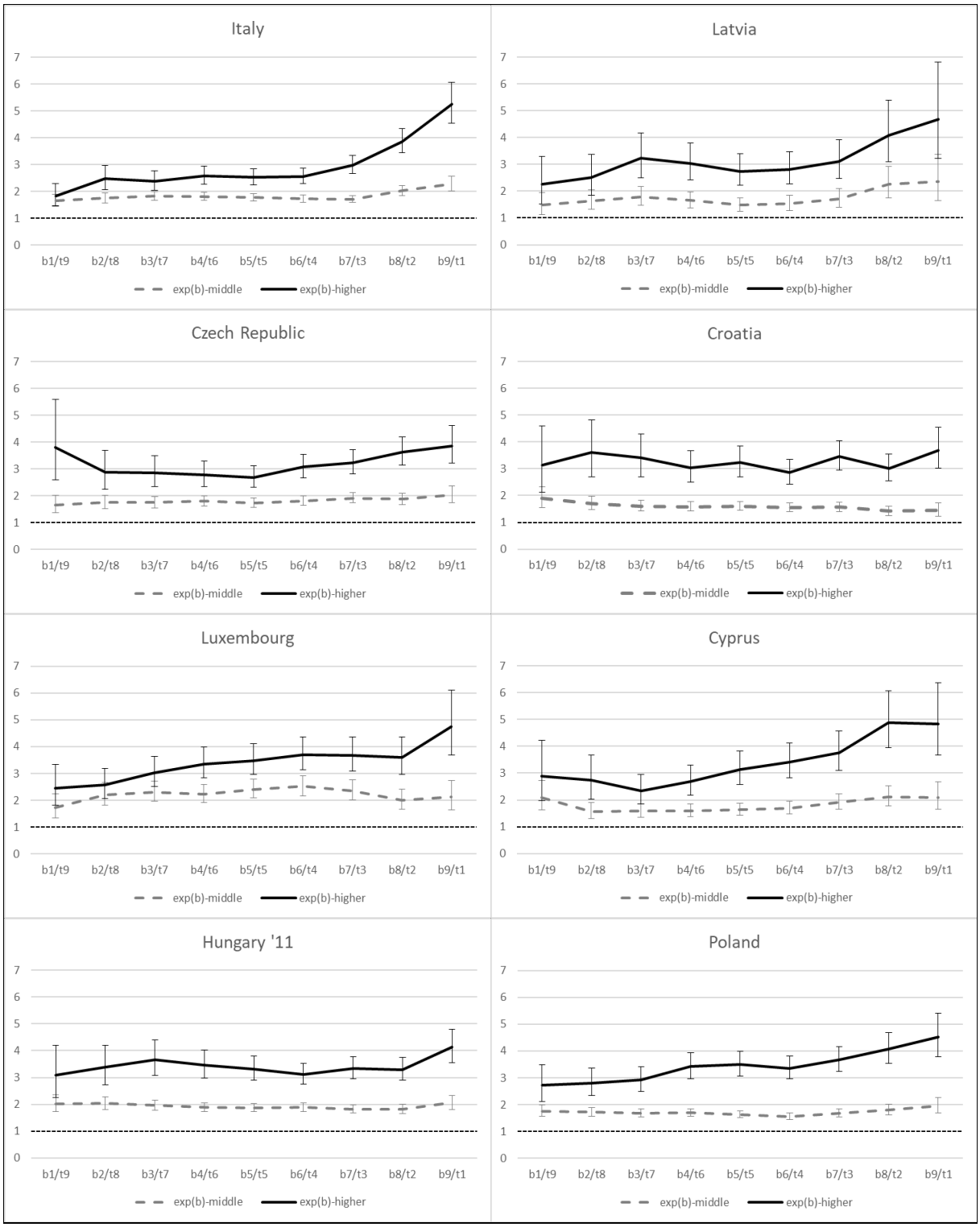
The estimation of the effect of parental education on material achievement yields an average value for the whole distribution, indicating its role in the increment of the target variable. However, one might reasonably assume that this average – while properly indicates cross-country differences (with all the usual caveats, of course) – masks a variation of values across the distribution. To put it differently: the role of parental education might matter differently for an offspring moving between bottom and middle-income groups than between middle to top income groups. This kind of analysis is – to our best knowledge – non-existent yet in the literature, hence we introduce it here.

To measure this variance, we run logistic regressions at each cut points of the income distribution. First, we estimate what is the odds ratio for various levels of parental education when the offspring's position in the 2-10th deciles is contrasted to its position in the 1st decile. Then we estimate the odds ratios contrasting the positions in the 3-10 deciles to the first quintile. And we carry out this procedure for all income cut points in a country, and for all countries separately. These odds ratios are shown in Figure 4, separately for middle level education and tertiary education to lower education, with confidence intervals also depicted.

Figure 4. Odds ratios for two levels of parental education ("higher" and "middle" contrasted to "lowest") at different levels of the income distribution (decile cutpoints 1-9)




Spain
Ireland
Slovakia
Lithuania
Hungary '19
Belgium
Greece
Switzerland
0
1
2
3
4
5
6
7
b1/t9
b2/t8
b3/t7
b4/t6
b5/t5
b6/t4
b7/t3
b8/t2
b9/t1
exp(b)-middle
exp(b)-higher


Italy
Latvia
Czech Republic
Croatia
Luxembourg
Cyprus
Hungary '11
Poland
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b1/t9
b2/t8
b3/t7
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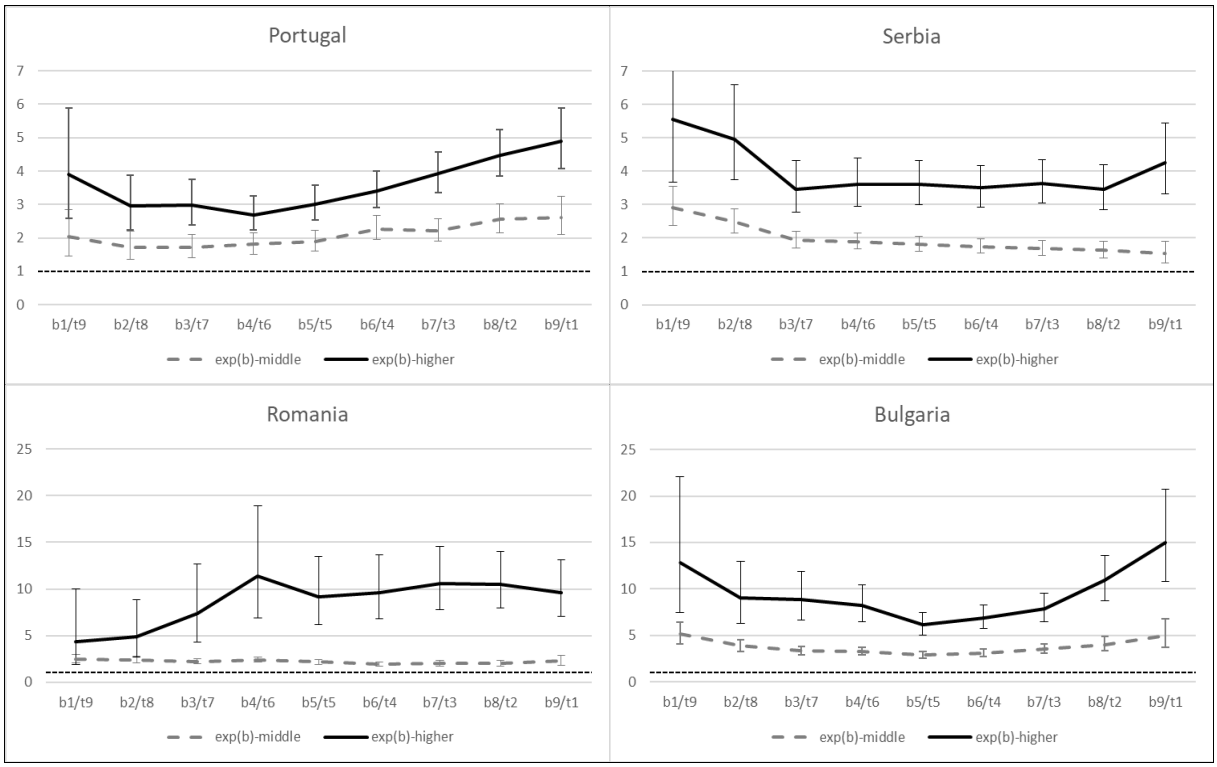
b9/t1
exp(b)-middle
exp(b)-higher



Source: EU-SILC 2019, own calculations

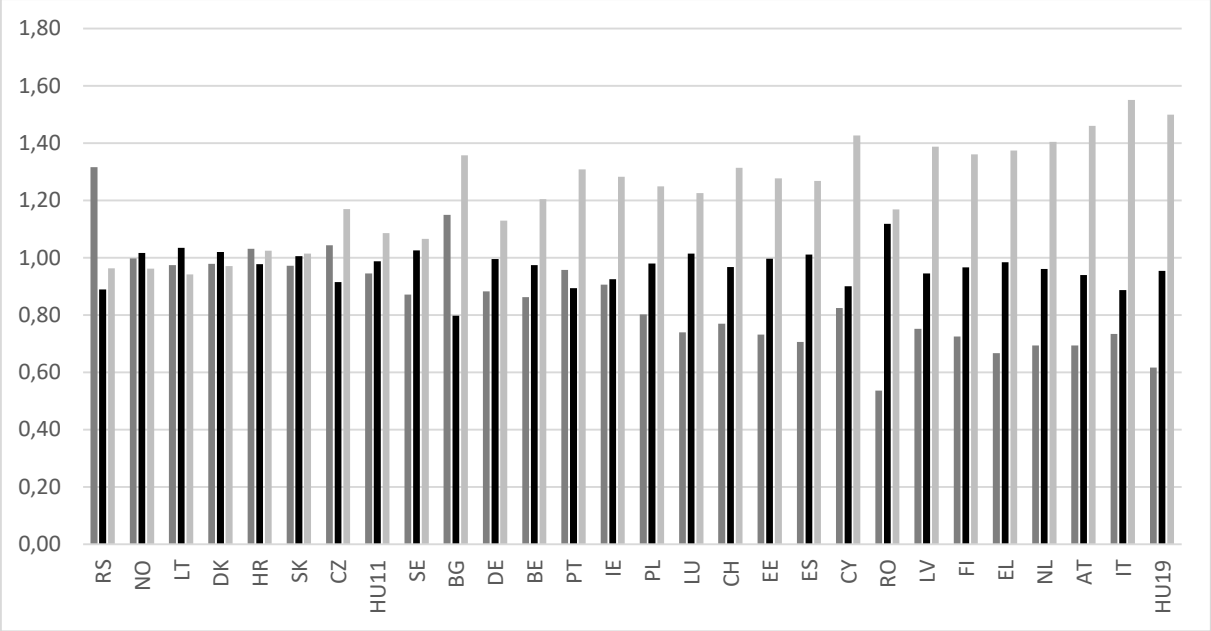
Note: Controls in the regression models are gender, age, degree of urbanization at 14, number of missing parents at 14, number of siblings at 14, parental financial situation at 14 years of age of the individuals in the sample

The odds ratios of children of middle-schooled parents compared to those of lower-schooled ones does not generally vary at various cut points within the various countries. However, there are significant cross-country differences in the effect of parental higher education at different points in the ranks. In most countries higher parental educational degree matters increasingly, when we go up in the income scale. This increase is more or less gradual and even in Belgium, Cyprus, Germany, Estonia, Greece, Spain, Hungary '19, Netherlands, and Poland. In some countries, the association is rather U-shaped, that is, at the two extremes, the effect of parental education is higher, while in the middle somewhat lower. Such countries are Bulgaria, Czech Republic, and Portugal. In Norway, Sweden, Slovakia, Croatia, Denmark, Hungary '11, and Lithuania although there are some variations, there are no strong tendencies, the effect of parental education is levelled. In other countries, in a part of income distribution is the tendency strongly differs from other parts of the distribution. Such countries are Romania, where from the lowest to the 4th lowest cut point the impact of parental education rockets, but after that it remains even. In Luxembourg and in Finland, it is the top cut point, where the difference jumps up compared to the lower cut points, while in Austria it is the 6th, in Switzerland and Italy it is the 7th (from the bottom).

To summarize the above findings a bit differently, we present the results in Figure 5 so that the bars show the ratio of average of Exp(B)'s for the bottom two cut points, the middle five cut points, and the top two cut points for higher parental education (that is, the black lines in Figure 4) to the average of the exp(B)-s for all decile cut points. To put it in other words, we prepare a standardized measure of the slopes of the differential exp(B)-s observable in Figure 4. These we call as relative stickiness of the floor, of the middle, and of the ceiling. In the

appendix (Figure A1), we also present the same for middle educated parents (that corresponds to data also shown by the grey line in Figure 4).

Figure 5. Rates of avg Exp(B) values of bottom two (stickiness of the floor), middle five (stickiness of the middle), and top two (stickiness of the ceiling) for parental education ("higher" contrasted to "lowest") at different levels of the income distribution compared to the average of all the nine odds ratios



Source: EU-SIL 2019, own calculations

Note: countries are ranked by differences between ceiling and floor exp(b) values.

We find that in most countries, there is a monotonic increase of stickiness as we go up in the cut points, that is, the ceiling is considerably stickier than the middle, and the middle is considerably stickier than the floor. However, there are some countries not showing this pattern. In some countries ((Norway, Denmark, Sweden) we see consistently low odds ratios, also across the various deciles. In some other countries with higher average odds ratios there are relatively small differences across deciles (like Lithuania, Croatia, Slovakia, Czech Republic, and Hungary '11). Finally, in some countries, the stickiness of the bottom is considerably stronger than the stickiness of the middle. These countries are Serbia and Bulgaria, where the effect of circumstances (see Figure 2) and of the education (see Figure 3) are among the strongest ones.

3.3. Mobility indicators and various macro (contextual) variables

For mobility research and for IOP research as well it is a challenge to explain the "why"-s, but the cross-country variation of equality of opportunities (or mobility chances) requires explanation. A scroll through the literature offers a list of some potential candidates for the explaining variables (with no intention to be fully exhaustive). The first and perhaps one of the most influential hypotheses is that cross-national social mobility rates are similar at the

level of underlying 'relative mobility chances', such that in all societies having a nuclear family system and market economy, the mobility pattern will be 'basically the same'. From this it follows that with economic development and converging family structures mobility patterns also converge across countries, therefore there is *not much need for specific explanation* to cross country differences. This is called the FJH hypothesis, after the authors of the seminal article spelling out this hypothesis (Featherman, Jones and Hauser 1975). Similarly other mobility researchers argue that there is a tendency for relative mobility rates (and, hence, social fluidity) to increase over time. This may be brought about by *economic development*, paralleled by a growing room for 'achievement' rather than 'ascription' in the societies (Treimann, 1970, Ganzeboom, Luijkx and Treiman 1989). The European mainstream of mobility research (mostly sociologists) underlines the importance of *class structure* in determining mobility regimes (Ericson and Golthorpe 1992, Bukodi and Godthorpe, 2020 and others etc). Yet another strand in the literature (mostly economists, predominantly from the US) argue that the there is a direct relationship between level of *inequality and social mobility*. The argument (referred to as the Great Gatsby Curve – hypothesis) goes that concentration of wealth/income in one generation constrains the ability of those in the next generation to move up the economic ladder compared to their parents (Corak, 2006, Krueger, 2012, OECD, 2018). The predictions of the theory are analysed in many economic papers (and also challenged by some sociology papers – see Bukodi and Goldthorpe 2018, for example).

For cross national comparisons of IOP results, the challenge is somewhat even larger than for mobility studies. While in social mobility there are standard measures of fluidity (especially in the sociological strand based on class or occupational mobility analysis, because of the standardized classifications), for IOP a number of factors should be taken into account when cross country comparisons are even at start. The assessment is further troubled by varying concepts of inequality of opportunity (ex post – starting from the evaluation of outcomes or ex ante – based on the evaluation of efforts), by varying measures of the target variable (for example Filauro et al 2023 analyses earnings, Checchi et al 2010 and Palomino et al 2018 on incomes and Palmisano et al 2022 concentrates on education outcomes). These definitions and research choices all imply different answer to the „inequality of what" questions – and therefore on what macro drivers shall we reasonably assume behind cross-national differences[14].

Nevertheless, there is one institutional argument that is of special importance for both mobility studies (be they be focused on class theory or on income distribution theories) and IOP studies (whatever definitions do they use). This particular institution is education, and, in particular, the higher education system (Bukodi and Godthorpe, 2020, Esping-Andersen and Wagner 2012, Checchi et al 2010, Checchi, Preagine and Serlenga, 2016, Filauro et al 2023, Palmisano et al, 2022, just to mention a few. The logical chain is straightforward: achievements in the labour markets (and, consequently, in income and wealth positions) are

[14] There are many other methodological choices that also define the empirical relevance of what is called „equality of opportunity" – with perhaps less implications for the selection of potential drivers (units of analysis (persons or households), the age constraint (full population or a restricted age bracket), universe for which the estimates are made (country (Checchi, Peragine and Serlenga, 2016) or pan-european (Filauro and Donkova, 2021) etc). However, we do not intend to go into these details here.

largely dependent on human capital investments, that are, in turn, dependent upon financial, cultural and network assets of the parents in the formation years of their children[15].

The inclusiveness and efficiency of the current education systems, therefore, have a direct impact on mobility chances of the future generations.

Finally, also related to the macro institutional determinants of the social organization, we assume that in general the meritocratic thrust of the social system matters. It is very difficult to measure though. However, we may assume that where transparency is low, corruption is high, social and political inclusion is limited, meritocracy has less rooms to play. We may, therefore, proxy meritocratic thrust with some related variables.

In what follows, we test our results on the role of circumstances with contrasting cross-country distribution of our results to economic affluence, inequality, class structure, educational structure of the society and transparency/rule of law indices.[16]

To test the macro-structural factors that can be associated with the strength of the circumstances variables, we apply correlation analysis, where our main left hand variable is the variance share jointly explained by the circumstances variables based on the regression-based inequality decomposition analysis, while our independent variables relate to the above categories[17].

[15] As Björklund and Jantti 2009 cite Solon, 2004, „the strength of the association between a child's and her parent's long-run incomes depend on (1) the extent to which parental innate ability is transmitted from generation to generation, (2) the efficiency by which spending on education translates into human capital, (3) the return to human capital the child will come to enjoy as an adult, and (4) the extent to which public spending on education is progressive (i.e., on the amount of public spending relative to parental income)".

[16] We do not specifically deal with the FJH hypothesis, given that in the previous sections we argued for the recognition that relatively large cross-country differences exist in the role childhood and parental circumstances have in income position. The list is still not exhaustive for other reasons: in addition to the factors analysed here, there may be many other reasons for cross national variations in mobility regimes: cultural values attached to getting ahead in society, the role of family in the social fabric, political and ethnic cleavages, social barriers, ranks, caste can all represent constraints to mobility, that we do not have the space to analyse here.

[17] We apply GDP per capita in Purchasing Power Standards (2019), Activity Rate in the 15-64 years old population (2019), Rate of mean income of the top decile and the bottom four deciles (2019), percentage of lower class people (2018), percentage of people with ISCED 0-2 in the 25-64 years old population (2019), percentage of people with ISCED 5-8 in the 25-64 years old population (2019), Standardized estimated score for Rule of Law (2019), Standardized estimated score for Control of Corruption (2019), Standardized estimated score for Voice and Accountability (2019).

Table 2. Correlation between the proportionate contribution of circumstance variables combined and some macro indicators

	Macroeconomy		Inequality		Class structure: % lower classes	Education attainment structure		Political inclusiveness and transparency		
	GDP	Activity rate	Gini	Top10/ Bottom40		ISCED 0-2 rate	ISCED 5-8 rate	Rule of law	Corruption	Voice
Circum stances	**-0,41**	**-0,68**	0,26	0,28	**0,65**	0,29	**-0,61**	**-0,59**	**-0,67**	**-0,57**

Source: x axis: aggregated value of circumstance variables from our own decomposition computations from EU-SILC 2019; y axis': 1. GDP per capita in Purchasing Power Standards: Eurostat 2. Activity Rate: Eurostat, 4. Gini: Eurostat, 5. Top10/Bottom40: EU-SILC 2019, own calculation, 6. Lower classes share: Goedemé, Paskov and Nolan, 2021, 7. ISCED 0-2 rate: Eurostat, 8. ISCED 5-8 rate: Eurostat, 9-11. Rule of Law, Control of Corruption, Voice and Accountability: Word Bank Worldwide Governance Indicators.

Note: Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Voice and Accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e., ranging from approximately -2.5 to 2.5.

In Table 2, we interpret the Pearson-correlational coefficients for each variable. We find significant negative correlations with activity rate, the share of the higher educated, the rule of law and the voice and accountability indicator for political freedom, meaning that these factors might contribute to social openness of the societies. Class structure (most notably, the share of lower classes people) also produces a high correlation, but with a positive sign (i.e. the higher the share of the lower classes, the more circumstances constrain social mobility). However, in case of income inequalities and the share of low educated people, this association is not significant.

We also interpret our results in scatter plots (see figure 6). For GDP, we find that in Western and Nordic countries that in Bulgaria, Hungary '11, and Slovakia, which are among the countries with the lowest GDP, the role of circumstances is even higher than expected. In face of that, Latvia, Finland, Germany, Netherlands, and Estonia are under the trendline.

Among countries with lower activity rates (Romania, Slovakia, and Bulgaria are highly above the regression line, showing higher role for circumstances than they would be predicted by the regression line with activity. At the same time Germany is under the regression line, pointing out that the "family backpack" might have a lower role than otherwise it could be expected in that country.

At income inequalities, the trend is somewhat more ambiguous. Beside the Northern countries, Slovakia and Czech Republic are among the most equal ones, while Lativa, Lithuania, Romania, and especially Bulgaria are highly unequal. Romania, Hungary '11, and Slovakia are unequivocally above the trendline, while Germany, Netherlands, Finland, Sweden, Estonia, Switzerland, and Latvia are below it. This is important for the better interpretation of the

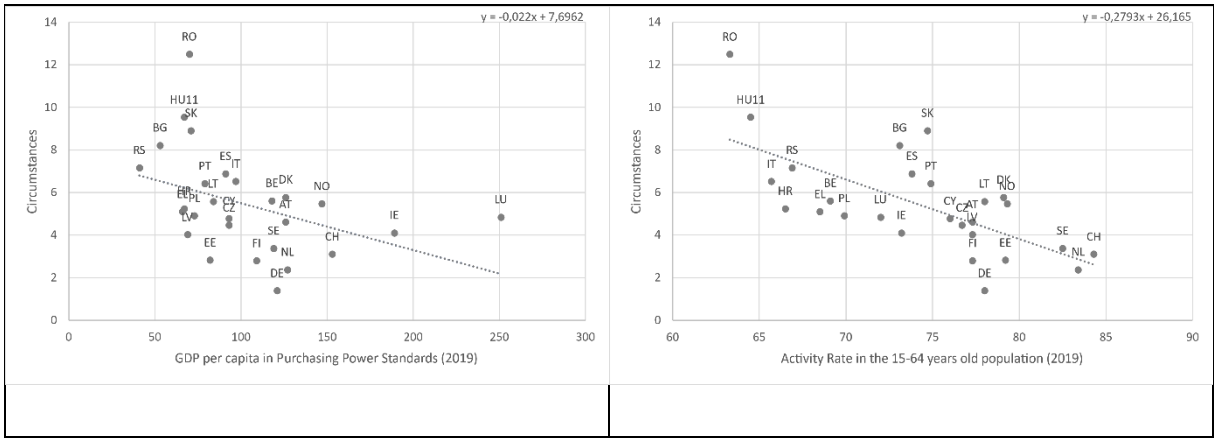
correlation coefficients shown in Table 2. We may reasonably suspect that institutional peculiarities in Romania, Hungary'11 and in Slovakia that keep the effect of parental circumstances high, deviating from the level that could be projected from the level of inequalities in these countries.

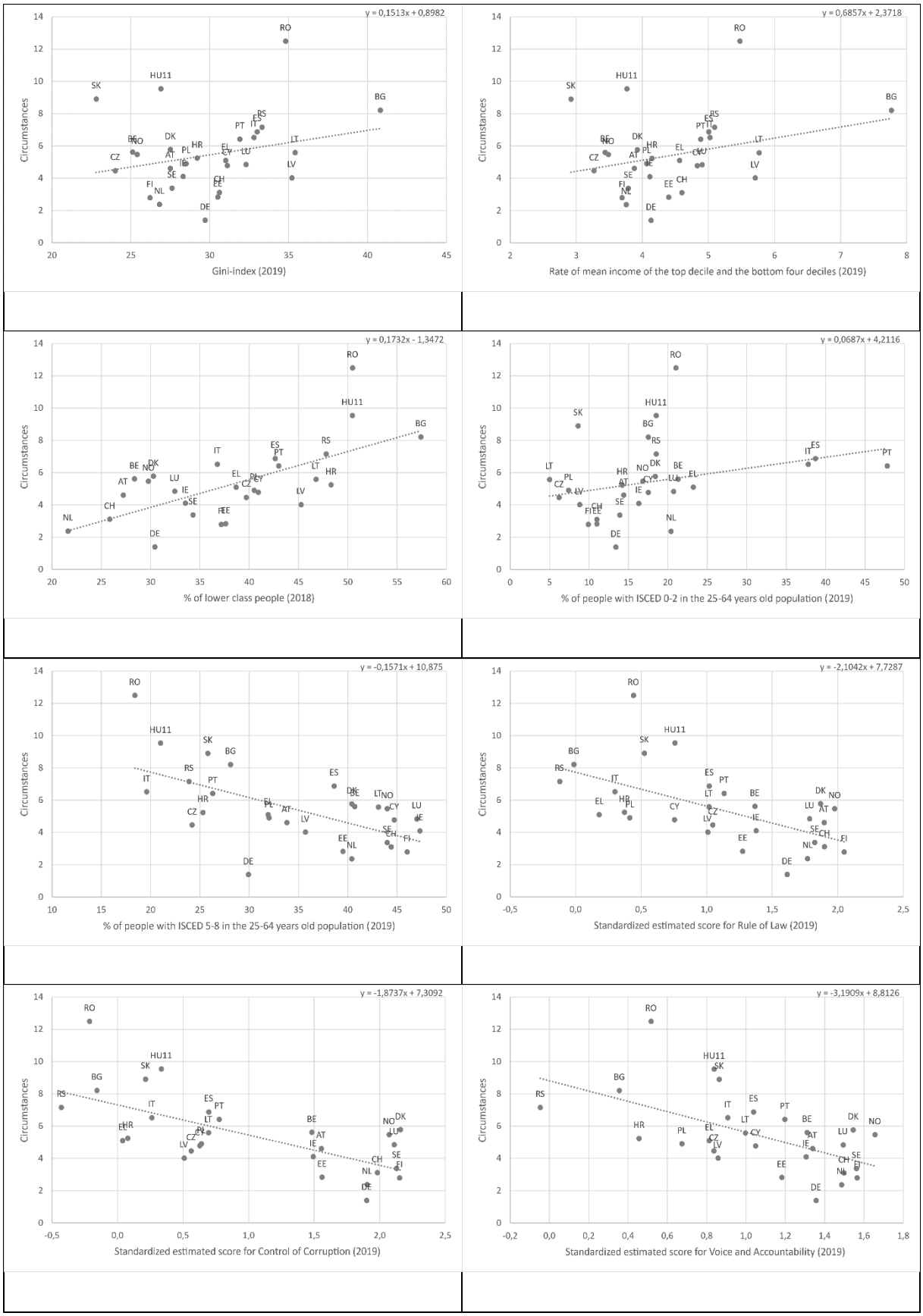
The proportions of lower-class people are in general lower in Western and Northern countries, but even this taken account, Romania and Hungary '11 are strikingly above the trendline, while Germany, Latvia, Estonia and Finland are under it.

Turning to the educational structure, we see that while in Italy, Spain and Portugal, the share of low educated people is extremely high, in other Southern and Eastern countries, this share is close to these levels in the Western and Northern countries. Nevertheless, Romania, Hungary '11, Bulgaria, and Slovakia are unquestionably above the trendline, while Germany, Finland, Sweden, Estonia, Switzerland, and Netherlands are below it. In case of the share of higher educated people, Southern countries, and most Eastern countries tend to have lower shares of higher educated people, although it is important to note, that in Baltic countries it is much higher. Again, Romania, Hungary '11, Slovakia (and Bulgaria, and Spain) are above the trendline, while Germany, Czech Republic, Netherlands, and Estonia are below it.

In Western, and Northern European countries the rule of law scores are higher, than in Eastern and Southern European countries. The higher score in rule of law usually corresponds to lower level of the impact of circumstances. Furthermore, Romania, Hungary '11, and Slovakia are well above the trendline, which means that in these countries, the inequality of opportunity is even higher than it would be predicted from the Rule of law scores.

Figure 6. Proportionate contribution of circumstance variables combined to inequality (vertical axis) and various macro/institutional variables (horizontal axis)





Source: x axis: aggregated value of circumstance variables from our own decomposition computations from EU-SILC 2019; y axis': 1. GDP per capita in Purchasing Power Standards: Eurostat 2. Activity Rate: Eurostat, 4. Gini: Eurostat, 5. Top10/Bottom40: EU-SILC 2019, own calculation, 6. Lower classes share: Goedemé, Paskov and

Nolan, 2021, 7. ISCED 0-2 rate: Eurostat, 8. ISCED 5-8 rate: Eurostat, 9-11. Rule of Law, Control of Corruption, Voice and Accountability: Word Bank Worldwide Governance Indicators.
Note: On definitions of variables capturing the political transparency and inclusiveness variables, see notes to Table 2.

In the Appendix we also present an extended version of Table 2 with the correlations. In Table A3, we also included earlier (2000) indices for some variables (activity rate, education structure, level of rule of law, control of corruption, and voice and accountability indicators). This table also indicates (among left hand variables) the relative stickiness indicators, and also the average of exp(b)'s for middle and higher educated parents, the average of the bottom 2, middle 5, and top two cut points (absolute stickiness of the floor, middle, and top) – we call these absolute stickiness indicators.

It is shown that the averages and the absolute stickiness of floor, middle, and ceiling for both educational parental levels show a very similar pattern as we could see at the circumstances (see the lower part of the table). This is the expected result, since among the circumstances, usually parental education is the strongest factor. What is more interesting is the relative stickiness (listed in the middle part of Table A3). In case of all the three variables of quality of governance, that is, the score for rule of law, corruption, and voice and accountability, both the 2000 level, and the 2019 level shows a negative association with relative stickiness of floor. Furthermore, it is true both more middle parental education and higher parental education. Although this association is rarely significant, the fact that it is in each case negative shows that the correlation probably does exist. It is also striking that the association with the 2000 scores is always stronger than it is with the 2019 ones. Apart from that, we can see that both for middle and higher parental education, the relative stickiness of the middle is lower in more unequal countries (be it measured either with Gini-index, or with Top10/bottom40-share. It indicates that in more unequal countries proportionally, floors and ceilings are stickier than the middle. Finally, there may also be a correlation between the share of low educated people and the relative stickiness of the floor and of the ceiling. While the floor is less sticky, ceiling seems to be stickier if the share of low educated people is high. This association is especially strong if we regard the 2000 data.

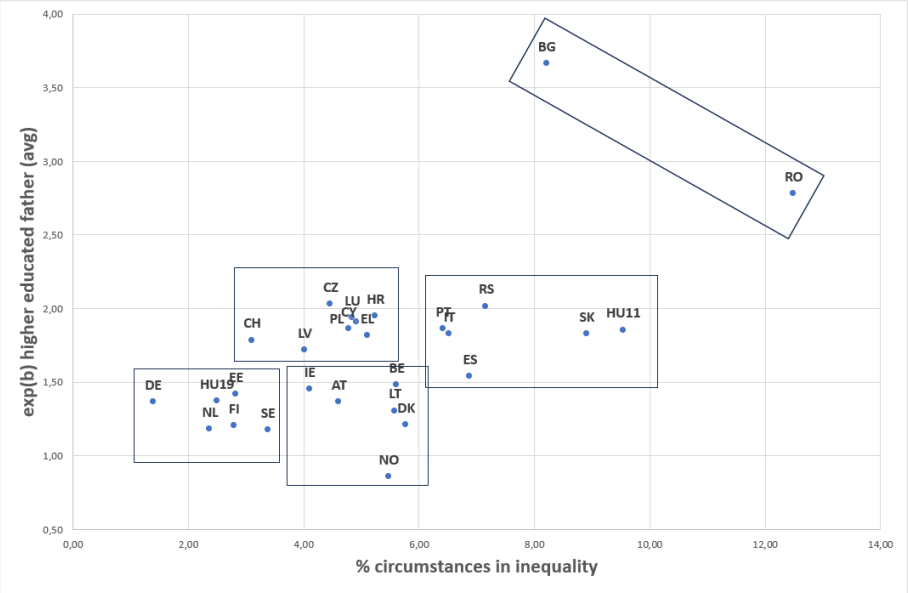
4. Discussion

In the above sections we attempted to explore cross country differentials of the role of circumstances (childhood circumstances and parental background) in the current income levels of the residents of the European countries. Applying various methods (simple R^2 comparisons, regression-based inequality decompositions and analysis of the odds ratios for individuals with higher educated parents to get ahead on the income ladder), we found some systematic and consistent pattern across groups of European countries (Figure 7).

The first group includes Germany, Netherlands, Finland, Sweden, and Estonia, where circumstances in general play a relatively minor role in determining the income situation of the active age adults. Having a higher educated father helps in getting ahead also in this group but the average odds for rewarding this resource are low (below 1.5), meaning that kids with higher educated fathers will also have relatively good chances for ending up in higher income deciles. Another group includes countries where the role of circumstances is higher but parental education does not seem to be very influential (odds are similar than in the previous

group). This group contains Ireland, Austria, Belgium, Lithuania, Denmark and Norway. Other factors (age, family demography) in this group play a role as circumstances (most importantly in Norway, where birthyear is a significant determinant). The third group is characterized by relatively sizeable role of parental education and significantly higher role of circumstances in general (Switzerland, Latvia, Poland, Greece, Cyprus, Luxemburg, Croatia and Czechia belong to this category). The fourth group is populated by Portugal Italy, Spain, Serbia and Slovakia. Bulgaria and Romania stand out – both in terms of the role of circumstances and in terms of the role of higher educated parents in getting ahead.

Figure 7. Position of countries by the role of circumstances in inequality (horizontal axis) and the relative advantage of a higher educated father (vertical axis)



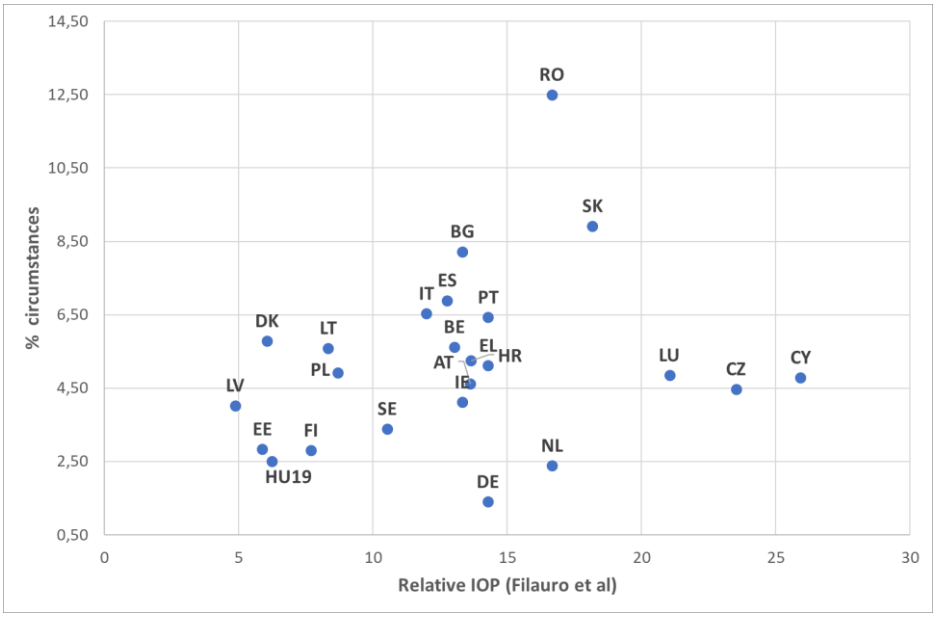
Source: own calculations based on EU-SILC 2011 and 2019

Comparing this country categorization to the ones based on inequality of opportunity (IOP) research, one finds similar, but not the same divisions.

First, we compare the percent of variance explained by circumstances in our study to the distributions found by Filauro et al 2023[18]. As shown in Figure 8, in our study the role of circumstances was found to be the largest in Romania, Slovakia and Bulgaria. However, Filauro et al found relative IOP the highest in Cyprus, Czechia and Luxemburg. In our paper we found the role of circumstances the lowest in Germany, Netherlands, Estonia, Finland and Sweden (and in the troubled Hungarian 2019 dataset), while by Filauro et al the relative IOP is the lowest in Latvia, Estonia, Denmark, Sweden (and Hungary '19). Reasons for these discrepancies are to be investigated in a different paper.

[18] Any comparisons like this are shaky, though. Filauro et al (2023) compute IOP measures for the active age population and for earnings. This latter distinction may cause large differences in certain cases.

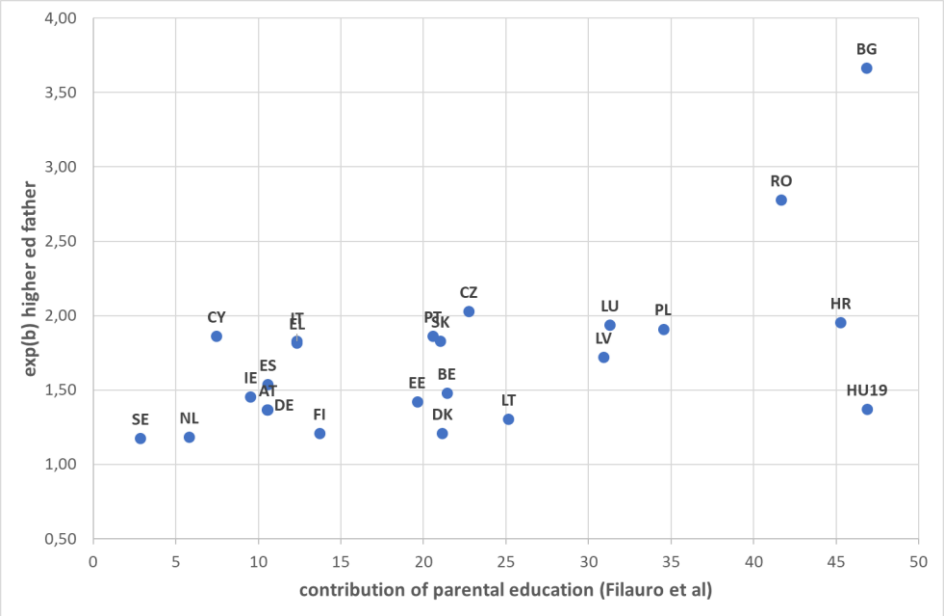
Figure 8. Comparing the share of inequality explained by circumstances (this study) to relative IOP (by Filauro et al, 2023)



We can also compare the results found by Filauro et al (2023) about the contribution of parental education to inequality of opportunity with our results on how important parental higher education is in getting ahead in the income ladder. Again, the comparison shall have to be treated with caution given the different left-hand variable (income versus earnings) and our restricted definition of the education variable (that came from problems we found with the 2019 SILC data). However, taking all these caveats, some comparisons may be made (Figure 9).

Similarities and dissimilarities are also worth highlighting. While in our study the Nordic countries (Sweden, Finland, Denmark, Lithuania) together with Netherlands and Germany are found to be the places where parental education matters the least, in the ranking by Filauro et al Cyprus, Ireland, Austria and Spain are also found themselves in the countries where parental education matters the least (together with Sweden, Netherlands and Germany), while Denmark and Lithuania belong to the middle group in their rankings (and to some extent, also Denmark). Results of both studies confirm the extra role of parental education in Romania and Bulgaria.

Figure 9. Comparing the role of parental education (average odds ratios from logistic regressions at various decile cut points in this study and the contribution of parental education to relative IOP (by Filauro et al, 2023)



A recent and probably the most comprehensive account of social mobility (Bukodi and Goldthorpe, 2020, differentiates between countries of high fluidity regimes and low fluidity regimes (with three socio-economic and regional subgroups in each). We compare their categorization with a classification of our findings (categorized into three levels of "circumstance regimes" in Table 3).

Given the different number of subcategories, some very simple comparative statements can only be made. In our analysis above, we categorized Germany, Netherlands and Switzerland as countries where circumstances play a relatively minor role (<4% explained by Ineqrbd). By Bukodi and Goldthorpe 2020, three countries are shown to be low fluidity regimes, implying a stronger role for circumstances. Both analyses agree that Bulgaria, Romania (and Hungary) belong to the low mobility regimes, but we found Slovakians to be more bounded by circumstances while in their analysis Slovakia belongs to the high fluidity set.

Table 3. Comparison of fluidity regimes by Bukodi and Goldthorpe (2020) with our findings about the role of circumstances (% attributed to childhood circumstances and parental background combined in regression-based decompositions)

This study (Ineqrbd % circumstances)		Bukodi and Goldthorpe fluidity regimes		
Low role for circumstances (<4%)	EE,	high fluidity set	Post-Soviet	EE, LT, LV, (RU, UA)
	HU19,		Post-Socialist 1	CZ, RO, SI, SK
	FI, DE, NL, CH, SE		West-Nordic	DK, FI, (FR), IE, NO, SE, UK
Medium role for circumstances (>=4%<8%)	LV, IE, CZ, AT, CY, LU, PL, EL, HR, NO, LT, BE, DK, PT, IT, ES, RS			
Strong role for circumstances (8%<)		low fluidity set	West-Central	AT, BE, CH, DE, LU, NL
			Southern	CY, ES, GR, IT, PT
	BG, SK, HU11, RO		Post-Socialist 2	BG, HU, PL

Source: own calculations based on EU-SILC 2011 and 2019, and Bukodi and Goldthorpe 2020, Table 3.

A major part of our study has dealt with the issue of what happens inside the distribution. For this we ran a large number of logistic regressions to estimate the odds of getting through the various decile cut points in the different countries. As already mentioned, we found that – on average – there are large cross-country differences in the average size of these odds (see figure 7, vertical axis).

With regard to the relative patterns of the distribution of these odds ratios (cf. the shape of the distribution lines in Figure 4), we see that in majority of the countries, higher education of the parents matters mostly for getting to the upper deciles. However, there are countries, where the effect of parental higher education is more or less evenly matters at the different cut points (Denmark, Norway, Croatia, Lithuania, Slovakia), and where beside the highest cut points, it is also important at the lowest cut points (Bulgaria, Czech Republic, Serbia). In face of that, the differences between the cut points are much lower if we regard middle parental education (compared to lower). In some countries the effect of middle parental education is especially strong at the bottom cut points (Austria, Denmark, Croatia, Lithuania, Norway, Serbia, Sweden, and Slovakia), in some countries, it is the upper cut points where the middle parental education exerts its effect (Cyprus, Hungary ’19, Ireland, Italy, Latvia, Netherlands, and Portugal). This a finding that has a policy relevance for education policy makers (which is actually a standard message from mobility researchers to policy people) education expansion is a precondition for more fluidity in the society.

When we turned to comparisons of our findings on how much circumstances matter, we tested a number of macro variables. Most notably we tested economic variables (GDP and activity rates) inequality data (Gini and the ratio of the average incomes in top decile to the bottom four deciles), class structure, educational attainment structure, and a few indicators of inclusiveness and transparency of the political structure (rule of law index, corruption index and the index for political voice and accountability).

Our findings have shown that we can identify association of most of these indicators to the level circumstances define incomes in European countries. We find that the larger the employment rate, the share of the higher educated and the lower the share of the lower classes, the constraint of circumstances on getting ahead in society are at the lower level. Political inclusiveness and transparency also matter, as we found negative correlations for the rule of law and the “voice” indicator for political freedom, meaning that these factors might contribute to social openness of the societies. All in all, we found that the level of unjustifiable inequalities (circumstances or the average of the cut points) is lower in countries where the quality of the governance is better, where the share of lower-class people is lower. However, in case of income inequalities and the share of low educated people, this association was not found to be significant. A more refined analysis, however, has pointed out that we may suspect institutional barriers to mobility in countries that are “blurring” the inequality-mobility relationship – actually, for the worse, as in some countries the role of parental and family variables is higher than it would be implied by the level of their inequalities. These points put that there is a need to analyse inequalities in a complex way (together with inequalities of opportunity and with the role of institutional structures).

5. Concluding remarks

Without repeating the findings presented in Section 4, we summarize shortly the major takeaway messages of the paper here.

Our main empirical findings relate to the cross-national variation of the role of parental background and circumstances variables in Europe. We found that the size of the „family backpack" varies across countries to a great extent, both in terms of the role of childhood circumstances and in terms of the role of parental education. We identified five country groupings by the combination of these effects. Four of them are characterised by combinations of weaker and stronger roles for parental education and other childhood circumstances. We also found that Bulgaria, Romania and – to a lesser extent – Serbia stands out both respects.

We have shown that the relative weight of parental education and circumstances differs across countries, e.g. in the Northern countries historic time (age) and childhood circumstances dominate over parental education in determining chances for material affluence.

We used different types of methods in the paper and then compared to results from IOP research and results from mobility research. From a birds' eye view, our decompositions reproduced many findings of the IOP literature, but our results are only partially consistent with the mobility literature.

A special part of our analysis is the observation that besides average effects of parental background on incomes, its size variation across the distribution also makes a difference between countries. We found that there is a roughly monotonous incidence in most countries, but there are U shaped patterns as well – meaning that parental education matters less in the middle than in the two ends of the income distribution.

This brings us to a methodological lesson: we hope we convinced the reader that the study of differential impact of circumstances along the distributional ranks provides a new perspective and it is worth refining and continuing.

Finally, as Hungarians, we need to say some remarks on data quality as well. The inclusion of the Hungary 2011 dataset was deliberate from our side. From different research exercises we had lessons of the problematic income data in the 2019 Hungarian SILC dataset. This preconception has been proven valid from our analysis here. Comparing the position of the country shown by the two different datasets, one remains to be convinced that the 2019 Hungarian SILC needs to be revised or dropped – at least for any kind of income distribution analyses.

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Annexes

Table A1. Definition of variables analysed

	Category	Variable name	Coding and reference categories	Note
Circumstances	childhood personal circumstances	sex,	female (ref.), male	
		age5,	25-29 (ref.), 30-34, 35-39, 40-44, 45-49, 50-54, 55-59	
		parent missing,	both parents missing (ref.), one missing parent, no missing parents	
		siblings,	0 (ref.), 1-2, 3+	
		degurba_14	city (ref.), town, rural	
	parental background	parental education	low – ISCED 0-2 (ref.), middle – ISCED 3-4, higher – ISCED 5-8	
		parental material (financial) situation parentfinsit	lower (ref.), lower-middle, upper-middle, upper	
Efforts		Own education attainment (isk_3, dummies)	lower – ISCED 0-2 (ref.), middle – ISCED 3-4, higher – ISCED 5-8	
		Own labour market position (fogl, dummies)	inactive (ref.), employed, self-employed	

Table A2. Standardized β coefficients for categories of parental education (reference: low education), controlled for "circumstances" and "circumstances + effort" (OLS regressions LH= person-equivalent net household disposable incomes, rows ordered by values in first column)

Parental education (ref: low)	higher		middle	
Control	circumstances	circumstances+efforts	circumstances	circumstances+efforts
SE	-0,01	**-0,06**	-0,04	**-0,05**
NO	0,03	**-0,07**	0,04	-0,03
DK	**0,06**	0,02	**0,07**	**0,05**
NL	**0,13**	**0,05**	**0,07**	**0,03**
DE	**0,15**	**0,06**	**0,07**	**0,04**
FI	**0,15**	**0,07**	**0,10**	**0,05**
AT	**0,18**	**0,08**	**0,11**	**0,06**
EL	**0,18**	**0,12**	**0,10**	**0,06**
SK	**0,19**	**0,13**	**0,13**	**0,09**
IE	**0,19**	**0,11**	**0,13**	**0,06**
HU19	**0,19**	**0,09**	**0,10**	**0,03**
PT	**0,19**	**0,10**	**0,10**	**0,05**
CH	**0,19**	**0,10**	**0,11**	**0,06**
ES	**0,20**	**0,12**	**0,08**	**0,03**
CY	**0,20**	**0,12**	**0,07**	0,02
CZ	**0,21**	**0,12**	**0,13**	**0,08**
IT	**0,21**	**0,14**	**0,13**	**0,07**
EE	**0,21**	**0,08**	**0,09**	0,03
HR	**0,22**	**0,11**	**0,11**	**0,04**
LT	**0,22**	**0,10**	**0,05**	-0,01
LU	**0,22**	**0,11**	**0,12**	**0,06**
PL	**0,23**	**0,13**	**0,11**	**0,05**
BE	**0,24**	**0,10**	**0,12**	**0,05**
HU11	**0,24**	**0,11**	**0,14**	**0,06**
LV	**0,24**	**0,09**	**0,13**	**0,04**
RS	**0,25**	**0,12**	**0,13**	**0,04**
BG	**0,28**	**0,18**	**0,10**	**0,04**
RO	**0,29**	**0,14**	**0,16**	**0,05**

Source: EU-SIL 2019, own calculations

Note: bold values are significant at p<0,05 level.

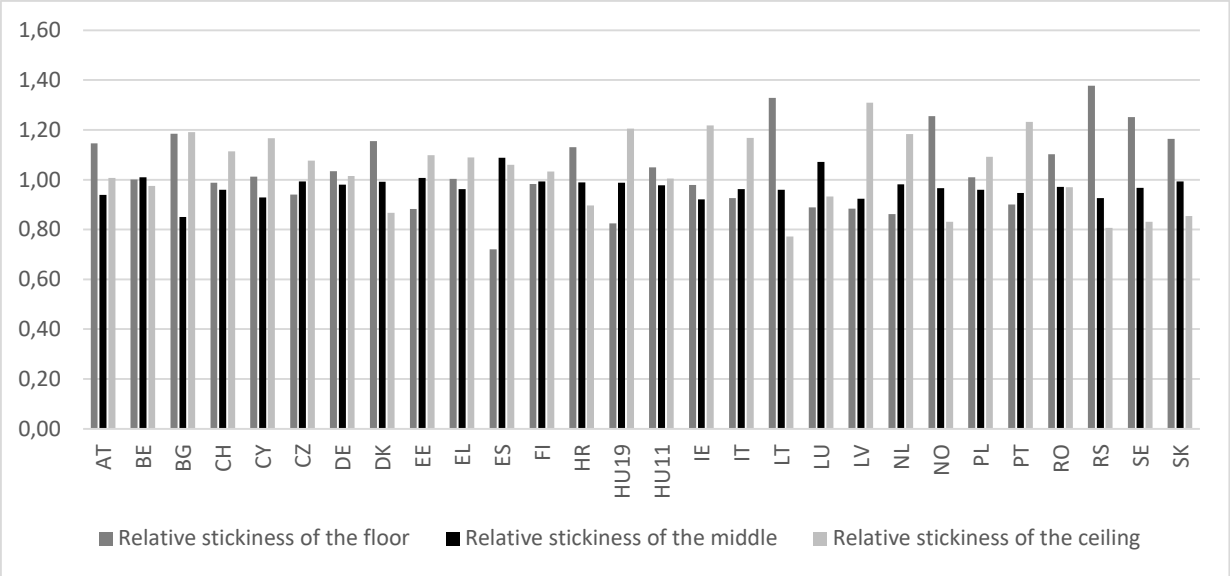
Table A3. Pearson-correlation between the different structural factors in a country and the level of different measurements of absolute and relative levels of stickiness

		Macroeconomy		Inequality		Class structure: % lower classes	Education attainment structure				Political inclusiveness and transparency					
		GDP	Activity rate	Gini	Top10/ Bottom40		ISCED 0-2 rate		ISCED 5-8 rate		Rule of law		Corruption		Voice	
		2019	2019	2019	2019	2018	2000	2019	2000	2019	2000	2019	2000	2019	2000	2019
Circumstances		**-0,41**	**-0,68**	0,26	0,28	**0,65**	0,22	0,29	**-0,48**	**-0,61**	**-0,53**	**-0,59**	**-0,58**	**-0,67**	**-0,46**	**-0,57**
Relative stickiness at	parent. educ.															
Floor	middle	-0,23	-0,05	0,02	0,06	0,22	**-0,49**	**-0,39**	0,31	-0,11	-0,35	-0,16	-0,25	-0,16	**-0,40**	-0,26
Middle	middle	0,36	0,00	-0,37	**-0,45**	-0,32	0,10	0,17	0,11	0,19	0,36	0,34	0,35	0,33	0,37	0,35
Ceiling	middle	-0,04	0,05	0,27	0,29	0,02	**0,41**	0,28	**-0,40**	-0,03	0,10	-0,09	-0,01	-0,10	0,14	0,00
Floor	high	-0,26	-0,06	0,00	0,08	0,34	-0,17	-0,14	0,12	-0,20	**-0,43**	-0,29	-0,35	-0,26	**-0,48**	**-0,38**
Middle	high	0,19	0,03	-0,26	-0,35	-0,19	-0,31	-0,19	0,25	0,16	0,20	0,32	0,22	0,28	0,27	0,30
Ceiling	high	0,08	0,03	0,23	0,25	-0,17	**0,44**	0,31	-0,34	0,05	0,24	0,00	0,14	0,00	0,23	0,11
Absolute stickiness at..	parent. educ.															
Average	middle	-0,14	-0,32	**0,56**	**0,66**	**0,51**	0,21	0,15	**-0,42**	-0,32	-0,37	**-0,46**	**-0,41**	**-0,43**	-0,37	**-0,46**
Floor	middle	-0,25	-0,30	**0,50**	**0,61**	**0,54**	-0,02	-0,04	-0,24	-0,34	**-0,48**	**-0,48**	**-0,47**	**-0,45**	**-0,51**	**-0,53**
Middle	middle	-0,05	-0,38	**0,51**	**0,61**	**0,48**	0,25	0,20	**-0,46**	-0,32	-0,32	**-0,42**	-0,38	**-0,40**	-0,32	**-0,42**
Ceiling	middle	-0,14	-0,21	**0,57**	**0,67**	**0,43**	0,30	0,22	**-0,44**	-0,25	-0,25	**-0,39**	-0,32	-0,37	-0,23	-0,36
Average	high	-0,36	**-0,48**	**0,65**	**0,71**	**0,69**	0,13	0,10	**-0,42**	**-0,49**	**-0,58**	**-0,60**	**-0,62**	**-0,62**	**-0,55**	**-0,64**
Floor	high	**-0,41**	-0,37	**0,61**	**0,71**	**0,70**	0,09	0,04	-0,30	**-0,44**	**-0,62**	**-0,62**	**-0,62**	**-0,60**	**-0,62**	**-0,68**
Middle	high	-0,33	**-0,52**	**0,60**	**0,63**	**0,66**	0,10	0,09	**-0,42**	**-0,50**	**-0,56**	**-0,56**	**-0,61**	**-0,59**	**-0,53**	**-0,61**
Ceiling	high	-0,32	**-0,42**	**0,68**	**0,75**	**0,63**	0,19	0,15	**-0,43**	**-0,43**	**-0,49**	**-0,56**	**-0,54**	**-0,57**	**-0,46**	**-0,57**

Source: 1. GDP per capita in Purchasing Power Standards: Eurostat 2. Activity Rate: Eurostat, 4. Gini: Eurostat, 5. Top10/Bottom40: EU-SILC 2019, own calculation, 6. Lower classes share: Goedemé, Paskov and Nolan, 2021, 7. ISCED 0-2 rate: Eurostat, 8. ISCED 5-8 rate: Eurostat, 9-11. Rule of Law, Control of Corruption, Voice and Accountability: Word Bank Worldwide Governance Indicators.

Note: On definitions of variables capturing the political transparency and inclusiveness variables, see notes to Table 2.

Figure A1. The average of the bottom two (stickiness of the floor), middle five (stickiness of the middle), and top two (stickiness of the ceiling) odds ratios for parental education ("middle" contrasted to "lowest") at different levels of the income distribution compared to the average of all the nine odds ratios. Values from logistic regressions controlled for "circumstance" variables



Source: EU-SIL 2019, own calculations