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Article

Different systems, same inequalities? Post-compulsory education and young adults' literacy in 18 OECD countries

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Abstract
Education is increasingly seen as a substitute for social policy, but opportunities for skill development vary by social background and educational institutions are not neutral in this respect. While previous research has extensively examined how schooling affects skills distribution, the role of post-compulsory education has been long overlooked. Using data from the 2011/2012 Programme for International Assessment of Adult Competences, this article investigates how selected features of upper secondary and tertiary education are connected to the social stratification of young adults' literacy skills in 18 OECD countries. First, I use individual-level regressions to assess the extent to which disparities in the skills of 24- to 29-year-old individuals are explained by parental education in each country. Second, I apply fuzzy-set qualitative comparative analysis across countries to investigate under which institutional conditions the social stratification of young adults' literacy skills is most severe. The findings point to the existence of functionally equivalent education regimes: young adults face severe disparities not only in socially selective higher education systems but also in relatively open systems characterized by institutional differentiation; moreover, disparities arising during compulsory schooling are consequential for the skill distribution of young adults, underscoring the importance of a life-course approach to education policies.

Keywords
Educational inequalities, educational systems, fuzzy sets, higher education, QCA, vocational training

Introduction

Skills are crucial for individual life courses and their distribution affects economic inequality at the societal level (Busemeyer, 2014; Mayer and Solga, 2008). Accordingly, proponents of the 'social investment

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state' have argued in favour of educational policies as an efficient tool to promote human capital development while simultaneously preventing, rather than compensating for, social risks (Morel et al., 2012). However, as a large body of evidence from the sociology and the economics of education demonstrates (e.g. Hanushek and Woessmann, 2011; Van de Werfhorst and Mijs, 2010), individual chances of skill development are deeply affected by social background, and educational institutions and policies are not neutral in this respect.

This article studies the social stratification of literacy skills among young adults and the institutional contexts where this stratification is most severe. The double significance of literacy skills, both instrumental and intrinsic, makes them particularly relevant from a social policy perspective. On one hand, in knowledge-based economies, literacy skills are central to ensure employability and their generality makes them widely applicable across working contexts (Estevez-Abe et al., 2001). On the other hand, literacy is also increasingly valuable in itself in what has been described as 'the schooled society' (Baker, 2014b): in this perspective, failing to attain a basic literacy level is a new social risk and educational policies need to ensure equal chances of skill development for all (Allmendinger and Leibfried, 2003).

Previous research has investigated the role of educational systems for the social stratification of skills, showing, for instance, that early tracking into distinct school types magnifies social background effects on literacy and mathematics skills (Marks, 2005; Schütz et al., 2008; Van de Werfhorst and Mijs, 2010). However, this literature has predominately focused on students in primary and lower secondary schooling. Due to a lack of comparable data on adult skills, later phases of the educational career have been less studied (for an exception, see Brunello and Checchi, 2007). However, post-compulsory education is increasingly relevant (e.g. for labour-market integration, see Bol, 2015), and it is therefore important to gain a deeper understanding of this education phase for the social stratification of skills.

This article addresses this gap by analysing internationally comparable data on adult literacy provided by the 2011/2012 Programme for International Assessment of Adult Competences (PIAAC) for 18

OECD countries. I examine the role of selected features of upper secondary and tertiary education for the social stratification of literacy skills among 24- to 29-year-old individuals; this age group is presumably out of education while at the same time not having being long exposed to labour-market factors affecting skill development. While previous cross-country studies have generally been concerned with identifying the net effects of single institutional features, I investigate under which *kinds* of educational systems – conceived of as configurations of interconnected elements – the social stratification of skills is most severe.[1]

My empirical results reveal that literacy skills reach similarly high levels of social stratification under different kinds of systems, pointing to the functional equivalence of specific aspects of secondary and tertiary education. This article thus contributes to our understanding of how institutions shape individual opportunities for skill development over the life course.

Theoretical background

Cross-national research has extensively documented social inequalities in skills, including literacy, during school years (for a review, see Hanushek and Woessmann, 2011). In a life-course perspective, social disparities emerging early can have long-term consequences because (1) skill development is a cumulative process, where advantages acquired at a young age positively affect future learning (Cunha et al., 2006), and (2) previous school performance crucially influences educational transitions and hence chances for further skill development. Hence, when examining the extent to which young adults' literacy skills depend on their family background, we should account for the processes of social stratification occurring in the early phases of students' educational careers. We can therefore expect that *countries where students' literacy skills are highly socially stratified during the first phases of schooling will also display high stratification of literacy among young adults* (carry-over effects mechanism).

The reverse is not necessarily true, however, because even in countries where skills are not severely stratified during early schooling, the

opportunities for skill development in later phases of education may vary by social background. In this article, I focus on the role of upper secondary and tertiary education because further training is less relevant for the age group under consideration (24–29 years old).

Institutional differentiation, that is, the explicit separation of curricular tracks within a given educational level, exists in most upper secondary systems, but to different extents (Allmendinger, 1989; Sørensen, 1970). In particular, vocationally oriented systems are characterized by a divide between a relatively small sector of generalist schooling, preparing students for tertiary education, and a large sector of vocational education and training (VET), preparing students for labour-market entry. Especially in such vocationally oriented systems, vocational training constitutes a 'safety net' against unemployment risks for individuals from low socio-economic backgrounds while simultaneously 'diverting' them from higher education (HE; Shavit and Müller, 2000); this two-sided function is reflected in citizens' perceptions of vocational training (Di Stasio, 2017). Research shows that students from disadvantaged backgrounds are indeed more likely to opt for vocational training (Hillmert and Jacob, 2003; Müller and Pollak, 2007). Hence, given the limited focus of vocational training programmes on general skills, institutional differentiation might contribute to an increased social stratification of literacy. I therefore expect that *countries with vocationally oriented upper secondary education will display high stratification of literacy among young adults* (VET-diversion mechanism). Extensive evidence indicates that early tracking increases the social stratification of skills by the end of lower secondary schooling (Marks, 2005; Schütz et al., 2008; Van de Werfhorst and Mijs, 2010). Hence, *in early-tracking systems, the VET-diversion mechanism might work in conjunction with carry-over effects*. In contrast, *in systems where tracking only occurs in the upper secondary cycle of education, diversion towards VET is presumably important on its own*.

Turning to the role of tertiary education or HE, one important aspect to be considered is the extent to which access to the system is open to students from less privileged backgrounds. Indeed, despite the great expansion of tertiary education which has occurred over the last century, the underrepresentation of children of non-graduates is still severe in many countries (Clancy and Goastellec, 2007; Koucký et al., 2007; Neugebauer, 2015; Shavit et al., 2007; Triventi, 2013). As we have seen, this *might be the consequence of the diversion of underprivileged students towards vocational training*, which in vocationally oriented systems constitutes a valid and less risky alternative. On the other hand, *in academically oriented systems, underprivileged students might be vulnerable to other access barriers*, such as high tuition fees, selection policies based on previous scholastic records and complex application procedures (Clancy and Goastellec, 2007; Shavit et al., 2007). Since individuals who enrol into tertiary education presumably have more opportunities to maintain and develop the general skills acquired in school, I expect that *countries with socially selective tertiary education systems will display high social stratification of literacy among young adults* (HE-access mechanism).

A relatively open tertiary education system, however, may not be sufficient to grant equal chances of skill development to all: similar to what happens during secondary education, underprivileged students might be diverted from the most valuable educational options (Brint and Karabel, 1989). Following Teichler (2008), I consider two main axes of institutional differentiation in tertiary education: by orientation (academic vs vocational) and by prestige. In the United States, vocationally oriented institutions were introduced early as community colleges, while in Europe they followed the advent of the 'mass university' in the 1960s and 1970s (e.g. *Fachhochschulen* in Germany, Austria and Switzerland; *Hogenscholen* in the Netherlands and Belgium; polytechnics in the United Kingdom; Huisman and Van Vught, 2009), yet, in several European countries, tertiary education is still strictly academically oriented. Prestige differentiation is manifest in systems with elite universities (e.g. Ivy League in the United States, *Grandes Ecoles* in France) and systems emphasizing university rankings (Baker, 2014a; Davies and Zarifa, 2012; Dill and Soo, 2005). While the differentiation between academically oriented and vocationally oriented institutions exists in both centralized and decentralized systems, prestige differentiation is only possible when

tertiary institutions are granted sufficient autonomy in their governance structure, that is, in setting curricula and programmes, managing human resources and selecting students (Huisman et al., 2007; Van Vught, 2009). The implications of institutional differentiation for the social stratification of literacy are not clear-cut. On the one hand, differentiated systems promote the inclusion of students who would not enrol in traditional universities (Arum et al., 2007); hence, *in countries with differentiated tertiary education, young adults should display comparatively low levels of social stratification of literacy* (HE-inclusion mechanism). On the other hand, students from disadvantaged backgrounds are systematically diverted towards second-tier institutions (Boliver, 2011; Kariya, 2011; Triventi, 2013), where they have presumably fewer chances of enhancing general skills such as literacy; hence, one would expect *high levels of social stratification of literacy among young adults in countries with differentiated tertiary education* (HE-diversion mechanism).

The mechanisms outlined above involve both complementarity and competition among institutions. On the one hand, for instance, vocationally oriented systems tend to have a socially selective tertiary sector precisely because vocational training diverts underprivileged students from HE. Likewise, since university admission is often conditioned on scholastic records, social selectivity in tertiary education may be the long-term result of social disparities in young pupils' skills. On the other hand, the access mechanism is the most likely alternative to the inclusion/diversion mechanisms: given the linkage between educational expansion and institutional differentiation (Arum et al., 2007), we can expect tertiary education systems with narrow and socially selective intake to display low levels of differentiation. Collectively, these hypotheses outline multiple pathways through which different kinds of educational systems can contribute to the social stratification of literacy among young adults. In other words, each of these hypothetical pathways is seen as *sufficient, but not necessary* for the social stratification of literacy, a notion known as equifinality (Ragin, 2008).

We can, however, envisage at least one necessary factor: with respect to the instrumental value of literacy, individuals invest in their skills with potential rewards in mind. However, as highlighted by the *Varieties of Capitalism* literature (Hall and Soskice, 2001), different educational systems and labour markets differently reward general skills such as literacy (Estevez-Abe et al., 2001). Recent empirical evidence indicates that the monetary returns to literacy skills do indeed vary substantially across countries (Hanushek et al., 2015). We can therefore expect that in countries where literacy matters to a limited extent, competition over the acquisition of such skills is weak and consequently their social stratification is diminished; in other words, that *the relevance of literacy skills as a valuable resource in the competition for desirable social positions is a precondition for their stratification* (resource relevance mechanism). A similar mechanism seems to be in place for qualifications since social inequalities in the attainment of certain university degrees are higher in countries where such degrees have a greater labour-market relevance (Triventi, 2013).

Analytical strategy and data

I adopt a two-step analytical strategy: first, with individual-level regressions, I assess the extent to which social background explains the variation in young adults' literacy skills in each country. Second, I explore the institutional configurations connected to the severe social stratification of literacy skills by applying fuzzy-set Qualitative Comparative Analysis (QCA) across countries. The two-step strategy is more flexible than multi-level modelling in dealing with clustered data because it does not assume the homogeneity of higher level units (Achen, 2005; Hanushek, 1974; Lewis and Linzer, 2005). Moreover, as shown by Schneider and Makszin (2014), the two-step strategy is particularly suitable in combination with QCA because it transparently displays cross-case variability.

First step

Data. In the first step, I analyse data from the Programme for the International Assessment of Adult Competences (PIAAC), an OECD study which assesses adults' skills using internationally standardized tests. Its first round – conducted in 2011/2012

– is the largest in terms of number of countries involved (24) and assesses literacy and numeracy skills.

The national samples, which are representative of the 16- to 65-year-old population, are restricted to the 24- to 29-year-old individuals. Additionally, because a crucial explanatory condition for the second step is derived from individual-level analyses on the 2000 wave of the Programme for International Student Assessment (PISA; see section 'Second step'), the analyses are restricted to the 18 OECD countries available in both surveys:[2] Austria, Flemish Belgium, Canada, Czech Republic, Germany, Denmark, Spain, Finland, France, Great Britain, Ireland, Italy, Japan, Korea, Norway, Poland, Sweden, and the United States. These restrictions result in sample sizes ranging from 345 (Italy) to 2147 (Canada) (see Table A1 in the Online Appendix for details).

Variables and models. To assess the extent to which differences in young adults' literacy are explained by social background, I run country-specific regressions on individual-level data from PIAAC, with the literacy skills of 24- to 29-year-old individuals (LIT) as dependent variable.[3]

The independent variable is operationalized as the highest educational level among parents in the International Standard Classification of Education (ISCED) scale, recoded as a dummy variable (HIGH-PARED) indicating whether at least one parent attained tertiary education (ISCED 5 or 6) or not (ISCED up to 4).[4] This is the only predictor in the main model specification; here, the parameter of interest is the proportion of explained variance (R^2), which constitutes the outcome for the second analytical step. In alternative model specifications where I control for migratory background (dummy variable for first- or second-generation immigrant vs natives) and gender, the parameter of interest is the standardized coefficient associated with HIGH-PARED.[5]

Second step

Method. The country-level analyses rely on QCA, a set-theoretic method that, through systematic case comparison, can identify patterns of sufficiency and necessity between selected explanatory factors and an outcome (Ragin, 1987, 2000, 2008). Compared to regression analysis, QCA is more suitable for assessing complementarity and equifinality arguments (Schneider and Wagemann, 2012) as the ones outlined in section 'Theoretical background'. Moreover, although applications in the field are still rare, QCA is particularly suitable for studying educational systems as configurations (Borgna, 2016; Freitag and Schlicht, 2009). The method should be seen as explorative because its goal is not to infer causal effects but rather 'to aid causal interpretation, in concert with knowledge of cases' (Ragin, 2008: 141). Hence, the identified patterns of sufficiency and necessity are to be intended 'as *potentially* causally relevant' (Schneider and Wagemann, 2012: 16; emphasis mine).

Cases (here, countries) are classified as members or non-members of a set representing the outcome to be explained (here, 'high social stratification of literacy') and of sets representing potential explanatory factors (see below) under a procedure known as calibration; set membership can be dichotomous or (as in here) 'fuzzy', that is, varying in a continuum from 0 to 1. It is then possible to identify combinations of factors associated with the outcome and to boil them down to their logically minimal components by applying fuzzy-set algebra (minimization process). As the cases under study limit the empirically observable combinations of factors, different strategies exist to deal with the configurations that lack empirical instances (logical remainders).[6]

Three parameters are useful when evaluating the resulting solution: the consistency parameter indicates the extent to which a minimized configuration is sufficient for the presence of the outcome and can be seen as a goodness-of-fit parameter; it varies between 0 and 1, where 1 corresponds to a perfect sufficiency relation. The coverage parameter conveys the explanatory power of a minimized configuration and varies between 0 and 1, where 1 indicates that all cases are explained. Finally, when a solution is composed of more than one minimized configuration, the unique coverage parameter returns the proportion of the outcome that is exclusively explained by a given solution component.

Data and fuzzy-set calibration. The outcome ('high social stratification of literacy') is based on the

proportion of variance in the literacy skills of young adults explained by parental education as estimated in the first step (see section 'First step'). To transform the R^2 into a fuzzy set, I adopt the direct method of calibration (Ragin, 2008: 87–90), which entails identifying three thresholds in the 'source variable': full membership (1), full non-membership (0) and maximum ambiguity or crossover (0.5); next, intermediate values are assigned according to a logistic function. I identify the thresholds through hierarchical cluster analysis.[7] Additionally, I calibrate an alternative version of the outcome based on the standardized coefficient associated with parental education estimated in a regression model controlling for gender and migratory status (see section 'First step'). QCA analyses on this alternative outcome support the robustness of the main results (see Tables A10–A12 in the Online Appendix).

The (potentially) explanatory conditions are as follows:

1. *Previously stratified skills* (STRAT-PISA), indicating a high level of social stratification of reading skills at the end of compulsory schooling for the relevant birth cohort.[8] Source variable: proportion of reading scores' variance explained by parental education at age 15 (R^2). This results from own analyses[9] conducted on the 2000 wave of the PISA, an OECD study assessing 15-year-old students' reading, mathematics and science skills.[10]

2. *Vocationally oriented secondary education* (VOC-SEC), measuring the relevance of vocational training in upper secondary schooling. Source variable: vocational orientation index developed by Bol and Van De Werfhorst (2011).

3. *Socially selective HE* (SE-HE), indicating that participation in tertiary education largely differs across socio-economic groups. Source variable: relative probability of enrolling in tertiary education for individuals with at least one parent who completed tertiary education as compared to individuals for whom neither parent completed tertiary education (own elaboration on PIAAC data, 24- to 29-year-old individuals).

4. *Vocationally oriented HE* (VOC-HE), measuring the relevance of vocational programmes in tertiary education. Source variable: proportion of students enrolled in type B programmes over the total of students in tertiary education, provided by the OECD.[11]

5. *Autonomy in tertiary education governance* (AUTON), measuring the autonomy of tertiary education institutions in setting curricula and programmes, hiring and managing teaching personnel, and selecting students. This serves as a proxy for prestige differentiation, as the latter is notoriously difficult to directly grasp in cross-country comparative analyses (Teichler, 2008: 355). The source information for this condition is qualitative (see below).

6. *Social salience of skills* (SKILL-SAL), measuring the relevance of literacy skills for attaining a prestigious social position. Source variable: coefficient associated with literacy in a regression with socio-economic status as dependent variable (on the International Socio-Economic Index of Occupational Status scale), after controlling for age, gender and educational level (own elaboration on PIAAC data).

For the explanatory conditions STRAT-PISA, VOC-SEC, SE-HE, VOC-HE and SKILL-SAL, I use the direct method of calibration; the thresholds are based on hierarchical cluster analysis and are adjusted in order to avoid excessively skewed distributions (Schneider and Wagemann, 2012: 248–9).

Reliable comparable data on the level of autonomy of tertiary education institutions are lacking; hence, I calibrate AUTON according to the indirect method (Ragin, 2008: 94–7); this consists in using qualitative information to assess whether each case is a perfect member of the set (fuzzy-set membership = 0.99), mostly but not fully in the set (0.8), more in than out of it (0.6), more out than in (0.4), mostly but not fully out (0.2) or fully out of the set (0.01). The main source of qualitative information used is the OECD thematic review of tertiary education, which provides a detailed description of the existing types of tertiary education institutions and

of their market and governance structure in the early 2000s (Santiago et al., 2008: 351–75). Additional information comes from the study on tertiary education governance conducted for the European Commission by the Center for Higher Education Policy Studies (CHEPS) of the University of Twente (CHEPS, 2006) and from the report on governance structure conducted in the framework of the MODERN project for the modernization of HE, sponsored by the European Commission (De Boer and File, 2009).[12]

To reduce the potential for limited diversity, I collapse two explanatory conditions into a higher-order one (Ragin, 2000: 321–8). As argued in section 'Theoretical background', the differentiation of tertiary education comprises two main dimensions (by orientation and by prestige), which are here operationalized as the relevance of vocational programmes and the autonomy of institutions. Correspondingly, the higher-order condition – 'differentiated higher education' (DIFF-HE) – indicates the presence of both dimensions or, in other words, the intersection (fuzzy-set min, logical 'and') of the sets VOC-HE and AUTON.

Tables A3–A5 in the Online Appendix report detailed information on the source variables, the calibration thresholds and the resulting fuzzy sets for both the outcome and the conditions. The truth table is reported in Table A6 and comprises 32 configurations, 13 of which display empirical instances and 19 of which do not (logical remainders).

Results and discussion

Figure 1 displays the results of the first step of analyses: parental education explains 10 percent or more of the total variance in the literacy skills of young adults in Flemish Belgium and Great Britain, but only 2–3 percent in Sweden, Italy and Korea.[13] The country ranking is very similar when using alternative measures for the social stratification of literacy skills, that is, the standardized coefficients associated with parental education, with and without controlling for gender and migratory background (see Figure A1 in the Online Appendix).

In the second step, I assess whether the higher levels of social stratification of literacy skills displayed by some countries are systematically connected to
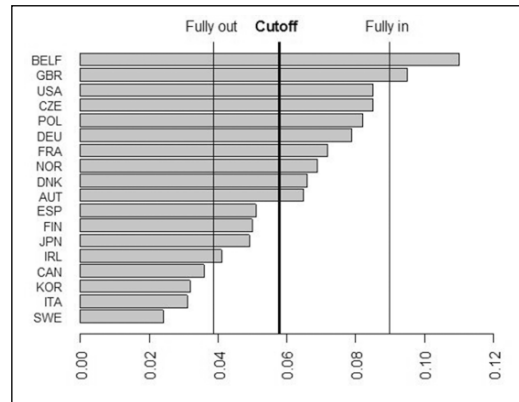

Figure 1. Proportion of variance in reading literacy explained by parental education and calibration thresholds. Source: own elaboration from PIAAC 2012 (24-29 year old).

certain institutional configurations. Figure 1 additionally displays the thresholds that define the fuzzy set corresponding to the outcome 'high social stratification of literacy' (cf. section 'Second step').

Table 1 displays the minimization results: three reduced configurations (or solution components) are logically sufficient for the outcome. In the first configuration, the social salience of literacy skills is combined with strong social disparities in the access to HE. In the second one, salience is instead coupled with a differentiated HE system. In the third configuration, severely stratified skills at the end of compulsory schooling are coupled with a vocationally oriented upper secondary system. All consistency parameters exceed 0.8, supporting the claim that each of these configurations is alternatively sufficient to predict the outcome. The coverage parameter for the whole solution indicates that, collectively, these configurations explain 83 percent of the outcome. The first and the third solution components have the greatest explanatory power: with coverage parameters of 0.53 and 0.55, they cover six cases each. In contrast, the second component covers only 29 percent of the outcome and three countries; the moderate explanatory power of the second component is also indicated by the low unique coverage parameter (0.09) and by the fact that only the United States is not covered by alternative configurations.

Table 1. Minimized configurations sufficient for the outcome.

Solution components	Consistency	Coverage	Unique coverage	Cases
SKILL-SAL * SE-HE	0.89	0.53	0.12	AUT, CZE, DEU; BELF, NOR; FRA
SKILL-SAL * DIFF-HE	0.84	0.29	0.09	FRA; GBR; USA
STRAT-PISA * VOC-SEC	0.89	0.55	0.16	AUT, CZE, DEU; DNK; GBR; POL
Whole solution	0.83	0.83		

Parsimonious solution. Frequency threshold: 1; consistency threshold: 0.7. Minimization based on the Enhanced Quine McCluskey algorithm implemented in the 'QCA' package in R.3.2.4.
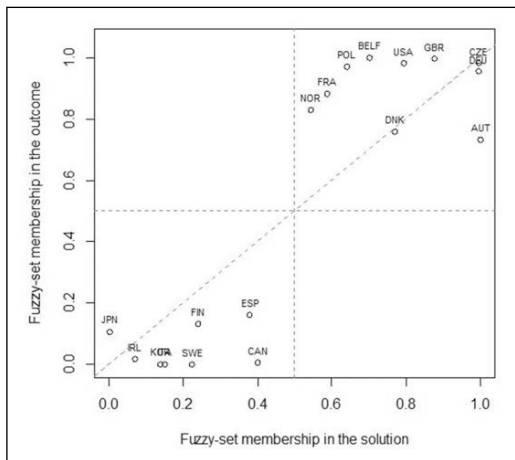
Figure 2. Fuzzy-set plot of the solution as sufficient for the outcome.

The goodness-of-fit and the explanatory power of these results are displayed in graphical form in Figure 2, which plots the membership score of each country in the outcome against its membership in the whole solution. The lower-right quadrant is empty, indicating that no case constitutes an 'inconsistency in kind' (Schneider and Wagemann, 2012: 306–10). Austria is positioned below the bisector, meaning that its fuzzy-set membership in the solution is higher than in the outcome: this case weakens the consistency of the sufficiency relation but can be considered an 'inconsistency in degree' since it surpasses the 0.5 qualitative threshold in the outcome (Schneider and Wagemann, 2012: 306–10). Given the asymmetrical nature of set relations, the cases belonging neither to the outcome nor to the solution (i.e. with membership <0.5 in both sets, bottom-left quadrant) are irrelevant to the evaluation of the

sufficiency argument. Finally, the empty upper-left quarter indicates that all cases are substantively explained by the solution; therefore, the lack of coverage of the solution is equally distributed across the various cases.

These results generally concur with my theoretical expectations. In particular, in contexts where literacy skills are socially relevant, the social selectivity of HE is a sufficient condition for their high social stratification among young adults (*HE-access mechanism*). Several country-cases belong to this configuration, which is also robust to different specifications of the analysis.[14] As expected, *the HE-access mechanism is partly complementary with the carry-over effects and the VET-diversion* ones. On one hand, Austria, Czech Republic and Germany belong not only to the first but also to the third configuration, owing to their severe stratification of skills among high-school pupils. In these countries, the underrepresentation of disadvantaged students in HE may be the result of social selection processes occurring during early schooling. On the other hand, the first configuration additionally explains the cases of Flemish Belgium, Norway, and France, where, during compulsory schooling, disadvantaged students score fairly well compared to more privileged peers. Interestingly, in these countries, tuition fees are comparatively low (Santiago et al., 2008); therefore, the existing socially selective barriers to HE are possibly an indirect consequence of the importance of vocational education at the upper secondary level, especially in Flanders and Norway, which generates processes of (self) diversion among students from low socio-economic backgrounds.

Second, the *HE-diversion mechanism seems to overrule the HE-inclusion one* because a high degree of differentiation in tertiary education is associated

with highly socially stratified skills. The empirical relevance of this second mechanism is nevertheless quite narrow and this is even more apparent in alternative specifications (see Tables A8, A9 and A12 in the Online Appendix). Due to the link between educational expansion and differentiation, I expected to find diversion towards vocationally oriented or less prestigious tertiary institutions as a mechanism alternative to the access one. While this might be true for the United States and Great Britain, in France the two mechanisms are combined since its HE system is at the same time socially selective and internally differentiated.

Institutional differentiation is also relevant with respect to secondary education. In countries where skills are highly socially stratified during compulsory schooling *and* a cleavage between vocational and general education exists at the upper secondary level, we find high levels of skill stratification among young adults. This result is robust across different specifications (see Tables A8, A9 and A12 in the Online Appendix) and covers not only systems that track students at a young age (Austria, Czech Republic, Germany) but also systems where tracking only occurs at the upper secondary level (Denmark, Great Britain, Poland). Hence, *carry-over effects* and *VET-diversion seemingly work together and even reinforce each other in both early-tracking and late-tracking systems*. Possibly, in late-tracking systems, parents anticipate the importance of school performance for the transition to upper secondary education. Since highly educated parents generally have more resources to help their children prepare for this transition, inequalities in literacy may be an anticipatory effect of tracking (Jackson et al., 2007).

Finally, the high salience of literacy skills for attaining a desirable socio-economic position may lead to their social stratification (*resource relevance mechanism*). However, *contrary to what was expected, this is not a necessary precondition*.[15] In other words, literacy skills can be highly socially stratified even in contexts where they matter to a limited extent in the labour market: specifically, this is the case of Poland. This result may suggest that the social competition over the opportunities for skill development is not only instrumental but also driven by the intrinsic value that individuals attribute to literacy. However, it should also be noted that the data

only allowed for a rather narrow operationalization of skill salience.

Conclusion

This article investigated the social stratification of young adults' literacy skills in 18 OECD countries and found that similarly high stratification levels are compatible with different kinds of educational systems. This finding is in line with classical sociological literature underlining the hidden stratification function of education (Bourdieu and Passeron, 1977) and the notion that educational inequality can be 'effectively maintained' under different contexts (Lucas, 2001). In this perspective, the idea that educational policies can completely replace compensatory social policies, advocated by the most radical proponents of the social investment state, appears illusory (see also Allmendinger and Nikolai, 2010; Solga, 2014).

Second, the findings underscore the importance of a life-course approach to education as social policy: social disparities that emerge during the early phases of schooling are still visible in the skill distribution of young adults, partly due to direct carry-over effects and partly due to (self-)selection processes in higher levels of education. In other words, low-skilled individuals might be the least likely to develop their skills. This confirms, on one hand, the importance of early education and care (Esping-Andersen, 2002), whose quality, as suggested by Gambaro (2017), is at risk in times of welfare contraction. On the other hand, a greater social inclusiveness of HE might also reduce social disparities in skills. Without disregarding the importance of economic barriers such as high tuition fees, this article pointed to less visible mechanisms of diversion, towards vocational training and less prestigious higher education programmes, which results in differentiated opportunities for skill development between young adults from more or less privileged backgrounds. These findings should serve as a reminder that besides its safety-net function, widely praised in the current policy debates on youth unemployment (Brzinky-Fay, 2017; Protsch and Solga, 2017), vocational training also contributes to the reproduction of social inequality (Shavit and Müller, 2000).

This article profited from a unique dataset to study adult skills across countries; however, the richness of PIAAC data in terms of skill measurement came with two drawbacks from the perspective of this article. First, the limited information of family background available in the survey resulted in a narrow operationalization of social stratification of skills, which might conceal direct effects of social class and status that work independently of parental education. Yet, previous research indicates that, insofar as educational attainment is concerned, such effects are declining over time, possibly as a consequence of educational expansion, while direct effects of parental education are stable or even growing (Becker, 2000; Schimpl-Neimanns, 2000). Second and most important, the case selection was constrained by the relatively little number of countries participating to PIAAC's first cycle. While the analysed countries cover various skill formation regimes (Iversen and Stephens, 2008; Willemse and De Beer, 2012), research should be extended to the new countries available in future PIAAC waves.

Notes

1. Brzinky-Fay (2017) adopts a similar approach to study the institutional contexts under which youth unemployment is most severe.
2. Among the 24 countries participating in Programme for the International Assessment of Adult Competences (PIAAC), two (Cyprus and Estonia) had to be excluded because they did not participate in Programme for International Student Assessment (PISA) 2000, two (the Netherlands and Slovakia) because of insufficient sample sizes in PISA 2000 and two (Australia and Russia) because of data availability and reliability issues, respectively, in PIAAC (Organisation for Economic Co-operation and Development (OECD), 2013a: 21).
3. PIAAC provides replicate weights and plausible values (PVs) to account for the complex sampling design and the uncertainty in skills measurement, respectively. I use the 80 replicate weights and the 10 PVs following the procedure recommended by the OECD (2013a): this results in 800 regressions for each of the 18 countries, whose estimates are subsequently combined according to Rubin's rules (analyses performed in STATA 13 using the package 'piaactools').
4. Admittedly, parental education captures only partially the multidimensionality of social background, which involves economic, social and cultural resources (Bukodi and Goldthorpe, 2013). While this operationalization is driven by data availability, for the scope of this article, parental education can be considered a sufficiently good proxy of social background because (1) previous research from different industrialized countries shows that, for recent cohorts, parental education is more predictive of individual educational outcomes than any other indicator of social background (Becker, 2000; Buis, 2013; Bukodi and Goldthorpe, 2013; Lörz and Schindler, 2011; Schimpl-Neimanns, 2000), and (2) since parental education, class and status are strictly interrelated, in regression models including parental education only, the estimated effect is to be understood not as a net effect but rather as a combined effect of parental education, class and status, to the extent that the latter are correlated with the former (Bukodi and Goldthorpe, 2013: 1030). Yet, it should be acknowledged that this operationalization constitutes a limitation of the article insofar as I cannot account for effects of social class and status that are *independent* of parental education.
5. The R^2 and the two standardized coefficients are highly correlated (Pearson's coefficient: 0.8–0.87) and produce similar country rankings: see Figure A1 in the Online Appendix. Qualitative Comparative Analysis (QCA) results remain stable when using these different measures as source variables for the outcome (cf. Table 1 with Table A12 in the Online Appendix).

6. Under the conservative strategy, logical remainders are not used in the minimization, whereas the parsimonious strategy uses all those apt to reduce complexity; an intermediate approach is to use only those for which plausible assumptions can be drawn. In this article, I follow Baumgartner's argument (2014) that, when interested in causal relations, the parsimonious strategy is preferable because the intermediate solution may contain redundant elements. Yet, the intermediate solution (reported in Table A9 in the Online Appendix) supports the validity of the findings.

7. Analyses were performed in R 3.1.1 using the complete linkage method. Results (available upon request) are robust to different distance measures.

8. The 24- to 29-year-old individuals surveyed in PIAAC were born between 1982 and 1988, and the PISA 2000 sample includes individuals born between 1984 and 1985.

9. Mirroring the analyses conducted on PIAAC, I run country-specific regressions with reading scores as dependent variable and parental education as independent variable. Similarly to PIAAC, PISA provides 80 replicate weights and 5 PVs, which I use according to the procedure recommended by the OECD (Wu and Adams, 2002): this amounts to running 400 regressions per country, whose estimates are then combined according to Rubin's rules (analyses performed in STATA 13 using the package 'pisatools').

10. PISA and PIAAC share a common approach to assessment and to construct specification and their measurement of reading and literacy is reasonably comparable (Jones and Gabrielsen, 2013; OECD, 2013b).

11. The data refer to 2004, when individuals from the birth cohort under scrutiny in this article were presumably eligible to enrol into tertiary education (OECD iLibrary, 2016).

12. The resulting indicator is conforming to students' perceptions about prestige differentiation in Europe (Eurobarometer, 2009): for my country sample, 'AUTON' is positively correlated with the share of students stating that university choice is mainly driven by institutional reputation (rho = 0.63) or by performance rankings (rho = 0.62).

13. Complete regression results are reported in Table A2 in the Online Appendix.

14. The Online Appendix reports as robustness checks: (1) an alternative parsimonious solution resulting from model ambiguities (Table A8), (2) the intermediate solution (Table A9) and (3) the parsimonious solution with outcome calibration based on the coefficient of parental education controlling for gender and migratory status (cf. Table A12). The minimized configuration 'SKILL-SAL * SE-HE' is a solution component of each of them.

15. This is confirmed by a formal test for individual necessity, where the consistency for skill salience is not sufficiently high (0.84; see Table A7 in the Online Appendix for details).

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