

Education and inequality: an international perspective

Patrick Bennett¹  | Kelly Foley² | David A. Green³  |
 Kjell G. Salvanes⁴

¹University of Liverpool

²University of Saskatchewan

³Vancouver School of Economics, UBC; Institute for Fiscal Studies

⁴Norwegian School of Economics; CEPR

Correspondence

David A. Green, Vancouver School of Economics, University of British Columbia, #163 – 6000 Iona Drive, Vancouver BC, V6T 1L4, Canada.
 Email: david.green@ubc.ca

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Abstract

In this paper, we summarise the existing literature and present new empirical evidence in order to address the questions of whether educational expansion is an effective tool for reducing inequality and whether some educational systems have better associations with lower inequality and others worse. We argue that – depending on the form the policies take, on the extent of intergenerational correlations in income and on the levers of educational access – policies that aim at increasing education are not necessarily beneficial in the sense of reducing inequality. Differential impacts of different systems by gender are particularly striking.

KEYWORDS

inequality, education systems, cross-country

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1 | INTRODUCTION

Education has been cast as a key culprit in the rise in inequality that has plagued developed economies in recent decades. Beginning with Katz and Murphy (1992), numerous papers about different economies have demonstrated patterns of employment and wage changes across education levels that imply that there have been ongoing increases in demand for more-educated workers relative to their less-educated counterparts. These skill-biased demand shifts imply that the wages of more-educated workers have pulled away from those of less-educated workers, resulting in increases in inequality. But if education is the locus of some of the inequality problems, education expansions have also been promoted as a solution to those same problems. In a standard neoclassical labour market model, raising the education level of one person in a fixed population means one more person

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to compete with the more-educated workers and one less to compete with the less-educated. The result would be a reduction in returns to education brought about, in part, by increasing the wages of the lower-educated. In this case, education policies have the appearance of a silver bullet: they both allow the economy to take greater advantage of technological advances (if those are what underlie the relative demand shift) and serve to dampen inequality at the same time. In this paper, we argue that this conclusion is potentially misguided: educational expansions can be (and we argue, in fact, have been) a force pushing inequality higher. In part, this can happen if technological change takes an endogenous form in which firms respond to an expanded supply of more-educated workers by shifting their capital towards working with more-educated workers and away from less-educated workers. In part, it can happen if higher-income families manage to steer the new educational opportunities towards their own children. That is, educational policy can serve to reinforce hierarchies rather than break them down.

In this paper, we look more closely at education policies as a response to increasing inequality, arguing that there is, indeed, reason for concerns that increasing education could exacerbate rather than reduce inequality. We frame our discussion in terms of what we see as the over-arching goal in addressing inequality: the creation of a more just society. With that goal, even if a policy such as education could increase economic growth, or even reduce earnings inequality, but does so in a manner that makes a society less just, then there would be reason to reject that policy. We argue (briefly) that education policy is particularly strongly related to the justness of society because it can provide the benefits described above but it can also create or reinforce hierarchies that affect both individual well-being and societal functioning. For that reason, it is important to understand the impacts of education policies on workers who do not increase their education level in response, the extent of intergenerational transmission of education and income, and how that transmission differs in different types of education systems. We discuss existing evidence on all of these points and bring in new empirical evidence on the relationship of intergenerational income and education mobility to different types of educational systems. The empirical work builds from the strengths of the Country Studies project, carried out adjacent to the IFS Deaton Review, because we were able to work directly with people from each participant country in our attempts to characterise the nature of the education systems in each.

In the main empirical work in the paper, we use OECD descriptions of educational systems that we coded in (and checked with participants from countries involved in the Country Studies project), in combination with measures of intergenerational transmission of education that we calculated using data from the Programme for the International Assessment of Adult Competencies (PIAAC). Based on a factor analysis, we argue that educational systems can be characterised by two key measures: a factor that captures the extent of streaming options at the upper secondary level and the age at which streaming starts (and which tends to be associated with a higher proportion of middle-educated boys in technical and trades occupations); and the proportion of children who attain a university education whose parents have a low level of education.¹ The proportion of children of university-educated parents who are themselves university-educated is also a useful measure of the rigidity of educational systems. Interestingly, there are systems that achieve high scores on streaming (Austria and Germany, for example) – which we call ‘blue collar’ systems – and systems that have high proportions of children of low-educated parents becoming highly educated (Canada and Finland stand out in this measure) – which we call ‘reach for the top’ systems – and a lot of countries with middling outcomes for both, but no country that scores highly for both.

We relate these different measures of education system to measures of cross-sectional and intergenerational inequality by country. The results of that exercise are very different by gender, echoing some results in the intergenerational transmission from the education literature discussed in Section 2. Countries with a high degree of streaming also have higher probabilities of boys

¹ Throughout the paper, we use the terms low, middle and high educated to refer to people whose highest level of education is some or completed high school, people with some post-secondary vocational education and people with a university degree, respectively.

from low-educated families attaining middle-education levels and have relatively low values of the Gini coefficient, corresponding to cross-sectional inequality. In contrast, the correlation between the streaming measure and intergenerational earnings mobility is negative for girls. The reverse is true for the ‘reach for the top’ systems: systems with a high proportion of low to high movement in education are associated with higher probabilities of daughters of low-predicted-income families moving to the top quintile in their own earnings distribution but (weak) negative associations with the same mobility measures for boys. Put in a regression context, systems with high amounts of streaming and systems with a high amount of mobility into the university level are both strongly negatively associated with cross-sectional income inequality. The countries that have low values for both the streaming measure and the educational mobility measure have the highest levels of cross-sectional income inequality, with Italy and the United States being particularly notable in this regard. Systems that have a ‘country club’ element to their education systems where the sons and daughters of the highly educated are much more likely to be highly educated also do poorly in terms of inequality.

We provide a rudimentary examination of the relationship of educational systems to the self-respect and social respect that we argue are at the heart of a definition of a just society by looking at the relationship between educational systems and the tendency of daughters of low-educated parents to have middle-educated or highly educated husbands. The central concept is that a clear marker of respect among groups is a willingness to have their children marry each other. We find that both high levels of streaming and high levels of intergenerational mobility in education are strongly positively associated with cross-educational marriages. We cannot definitively reject the possibility that the patterns we show stem from a greater incentive for sorting by education in higher-inequality societies, but we believe that a reasonable interpretation of our results is that educational systems that provide more options for upward mobility are associated with more equal societies in terms of income and, under our interpretation, in terms of respect.²

Overall, we believe that the evidence we discuss in this paper indicates that expanding education is not a silver bullet for addressing inequality and, depending on how it is done, might even increase inequality. The strong intergenerational persistence in education implies that general subsidisation of higher education is often more likely to be to the benefit of children from middle- and upper-income families than children from lower-income families. And evidence from the literature on the general equilibrium effects of educational expansions indicates that they may have few, or even adverse, effects on educational earnings differentials. The implication is that the specific form of education systems and educational expansions matters, and we find suggestive evidence that this is the case. This does not necessarily imply that inequality would fall in the high-inequality countries if they adopted one of the types of education systems that provide more mobility options or broke up the ‘country club’. But it does indicate that the inequality in those countries extends beyond inequality in income alone to inequality in educational opportunities that are likely to be deeply related to feelings of self-efficacy and to the sense of the justness of their society held by members of the society.

2 | EDUCATION, MERITOCRACY AND JUSTICE

In his famous book, *A Theory of Justice*, John Rawls argues that justice is the sovereign virtue of social institutions. He defines social institutions (which are the central focus of his theory) as the key elements of the basic structure of society, distributing ‘fundamental rights and duties’ and determining ‘the division of advantages from social cooperation’. Rawls (1999, p. 6) states that ‘[t]aken together as one scheme, the major institutions define men’s rights and duties and influence their life-prospects,

² We also examined the relationship of educational systems to rates of deaths of despair, under the hypothesis that systems that engender more mobility are those that make people feel less trapped by globalisation and technological events beyond their control. However, we did not find any strong correlations of our system measures with the rates of deaths of despair across countries.

what they can expect to be and how well they can hope to do. The basic structure is the primary subject of justice because its effects are so profound and present from the start.'

Reading this, it is immediately evident that the education system is one of those major institutions – a system that defines life prospects and determines the division of advantages from social cooperation in profound ways. Indeed, Rawls spends a substantial amount of time considering the role of education and its returns. Following from that perspective, we frame our discussion in terms of the impact of education on the broad goal of making a society more just.

Of course, such a statement is empty without specifying a particular notion of justice. But choosing any one specific theory of justice risks trampling on a key tenant of liberal democracies: that citizens be allowed to pursue (within limits) their own notions of what is good and to hold their own notions of what constitutes justice. Our response to that conundrum is to look for a core commonality across theories of justice, using that as our benchmark rather than focusing on one complete theory. In Bennett et al. (2024), we reference theories of justice stretching from the liberal theories of Rawls, Nussbaum, Sen and Anderson to the more communitarian perspective of Sandel, to the feminist theory of Kittay and the ideals of justice underlying North American Indigenous societies to argue that providing the bases of self-respect is a prime candidate for that commonality. Importantly, for all of these theorists, respect has a crucial social dimension. Anderson (1999), for example, talks about a 'community of equals', and Rawls (1999, p. 386) argues that self-respect stems from a combination of having a rational plan of life, 'a confidence in one's ability, so far as it is within one's power, to fulfill one's intentions' and 'finding our person and deeds appreciated and confirmed by others who are likewise esteemed and their association enjoyed'. Based on this, in our discussion, we focus on the goal of providing access to the bases of the combination of self-respect and social respect for all. While we view that focus as somewhat general, it fits most easily with the theories of philosophers who focus on creating what Deborah Satz calls 'a democratic society of equals' (Anderson, 2007; Satz, 2007).

A focus on justice and, more specifically, on providing the bases of self-respect and social respect to everyone in society necessarily places restrictions on how we allocate access to education. Rawls's discussion of education, which is distributed across *A Theory of Justice*, embodies the central tensions in the design of education policies. On one side, we want to allocate access based on efficiency considerations. The key idea in Rawls's 'difference principle' is that inequalities are allowable if they are to the good of all (which translates into the good of the least well-off type of person). We presumably want to find a way to allocate the most dexterous people to be brain surgeons, paying an earnings differential that recognises the long training needed to become one. But education, at the same time, has direct implications for both of Rawls's component parts of self-respect. It allows us to develop our capacities so that we can gain confidence in our abilities. It also, in modern societies, tends to define places in social hierarchies, affecting whether 'our person and deeds [are] appreciated and confirmed by others' (Rawls, 1999, p. 386). For Rawls, these concerns lead to the conclusion that meritocracies are fundamentally unjust and violate his 'principle of redress' – that is, there is a positive requirement to redistribute inequalities that are not to the good of all. Importantly, those inequalities are not just inequalities of income. A meritocracy is, even more, about an unequal distribution of social respect.

Rawls's conclusion about the unjustness of meritocracies would potentially sit uneasily with many economists. As Sen points out, we could see a meritocratic system as any system that rewards actions that promote the good of society or that are viewed as right actions, and we would expect societies to construct such systems – to set up systems of incentives for actions that are for the societal good (Sen, 2000). But Sen argues that these systems can become problematic – falling into the category of what Anne Case and Angus Deaton call 'unequal meritocracies' (Case and Deaton, 2020) – when a combination of factors arise: when merit is attached to people rather than actions, raising the possibility of the emergence of what Satz calls an 'aristocracy of talent'; when we forget that the merit system is just instrumental and start treating the returns it awards as 'deserved'; or when we form too narrow an ideal of the goals of society, acting as if the merit system is only about efficiency rather than making the goal a more just society. Deborah Satz's call for making the goal of education policy to be to meet a standard of adequacy that is defined in terms of a goal of equal citizenship is

a response to these potential problems (Satz, 2007). And there is every reason to believe that these problems are more than just potential. Michael Sandel, in his book *The Tyranny of Merit*, argues that the US has failed in all the areas that Sen lists. The result is a loss of respect for those who do not acquire education and who, Case and Deaton argue, show up in the catastrophic numbers in deaths of despair in the US (Case and Deaton, 2020).

We are interested in understanding the role of different educational systems in promoting or resisting the emergence of ‘unequal meritocracies.’ Do we see less persistence in education levels and incomes across generations (i.e. less evidence of aristocracies of talent and wealth) in countries with educational systems that provide more options for training in the trades, for example? We pursue those questions in the empirical sections of this paper. More generally, we are interested in whether different educational systems have differential impacts on the distribution of social respect that we view as being at the heart of a just society. We take a preliminary stab at that question with data on marriage rates across education groups.

3 | INTERGENERATIONAL PERSISTENCE IN EDUCATIONAL ATTAINMENT

Across many fields, there is a long tradition of viewing intergenerational mobility in education, relating the educational attainment of parents and children, as an indicator of equality of opportunity in a society. Education tends to be a strong predictor of lifetime earnings (Card, 1999), and the link between family resources and children’s human capital plays a substantial role in explaining the intergenerational transmission of well-being including health, income and human capital accumulation across socio-economic groups and across countries (Black and Devereux, 2011; Bjørklund and Salvanes, 2011).

Within the canonical model of intergenerational transmission of education, there are two main channels pushing towards a socio-economic gradient in educational investment (Becker and Tomes, 1986). The first is that more-educated parents are able to help with and encourage their children’s investment in human capital. The second is that parents face a budget constraint and choice between their own consumption and investing in their children’s human capital. Parents who are less wealth-constrained (who are typically highly educated) will have a lower marginal utility of consumption, which, in turn, leads to a greater willingness to invest in their children.

Working within this broad framework, more recent empirical work has shown that the extent and success of educational investments depend not only on lifetime parental resources but also on the ages in the children’s lives when those resources were available (Carneiro et al., 2021). Childhood development is viewed as a dynamic process that starts in utero and continues throughout childhood and adolescence (Cunha, Heckman and Schennach, 2010). Pre-school years have been shown to be a particularly crucial time for human capital investments, with those early investments acting as a complement to later investment (Black, Devereux and Salvanes, 2007; Cunha et al., 2010; Currie and Almond, 2011; Carneiro et al., 2021). There is also evidence of high returns to investment during teenage years (Carneiro et al., 2023).

Interacting with parental decisions, there is also a role for education policies to improve intergenerational mobility. For instance, improving the parents’ education levels through education reforms will have a spill-over effect on their children’s education levels. Importantly, the set of policies that affect these decisions reaches beyond direct school policies (such as tuition and mandatory attendance policies) to include policies related to early health and childcare – and the effects of these policies interact in complex ways. For instance, the recent literature evaluating early child development illustrates that family policy may play an important part in promoting equality of opportunity across socio-economic classes. An example of this is the successful infant care programmes established in Denmark, Norway and Sweden from the 1930s onward, which were substantially reformed in the 1950s and 1960s (Hjort et al., 2017; Bütikofer, Löken and Salvanes, 2019; Bhalotra et al., 2022).

In the remaining sections of the paper, we examine issues related to education policy in more detail. We frame this discussion in relation to a key set of conclusions that emerge from the intergenerational transmission literature. First, although college and university attendance has been increasing over the last decades across all OECD countries, still only about 40 per cent of the birth cohort aged 30–39 in 2019 eventually attended some level of higher education, with some countries such as Greece and Italy having a much lower percentage, and countries such as Canada quite a bit higher. This means that most young people enter the labour force with either only an academic high school diploma or only middle school, and could be better off in the transition to the labour market with skills more related to an occupation they are taking up. In the long run, this group may be better off with a vocational degree in terms of reducing the drop-out rate from high school, reducing youth unemployment and increasing lifetime earnings, compared with their having no degree or only an academic high school diploma. A high share of this group are boys, who recently have been observed to struggle more to acquire a university degree. Moreover, this group of non-college students, as we will show, is dominated by young people from a low socio-economic status (SES) background, which is at the core of our interest here. We highlight three aspects of education policies that have been discussed in the literature as potentially affecting intergenerational mobility in education.

A second main conclusion from the literature is that the efficacy of education policies depends crucially on how they interact with family preferences and investments, and family budget constraints. For example, there appear to be differences in expectations of returns to higher education by SES group, with low-educated parents underestimating the returns to education (Foley, Gallipoli and Green, 2014; Boneva, Golin and Rauh, 2022). Related to this is the long-standing hypothesis from the sociological literature that the returns to higher education, especially stemming from attending elite universities, are lower for candidates from low SES backgrounds (Crawford et al., 2016; Bukodi and Goldthorpe, 2018). There is both supporting and contradictory evidence of this in the recent economics literature (Zimmerman, 2019; Chetty et al., 2020; Britton, Dearden and Waltmann, 2021; Cattán, Salvanes and Tomoney, 2023).

These patterns have important implications for education policy. In particular, in a context in which parental attitudes, information and budget constraints generate a socio-economic gradient in higher education, policies that subsidise higher education in general may mostly be used by families with middle and higher education. The result could be increases rather than decreases in intergenerational education differentials by parental education. A case in point is found in Canada's Registered Education Savings Plan (RESP), a tax-sheltered savings plan that was originally introduced to reduce the effects of differences in family income constraints on educational choices for children. Even after a 2004 extension under which the government made contributions to savings plans for children of low-income families even if the families were unable to make contributions, RESPs were mainly used by middle- and upper-income families. Only 15 per cent of families eligible for the free contributions by the government actually took them up (Essaji and Neil, 2012).

A key distinction in education policies (that we highlight in our empirical work) is between systems that stream children into vocational versus academic tracks and those that emphasise a broader academic education without an attempt to steer students into particular channels. On the one hand, streaming may have a positive effect on intergenerational mobility, to the extent that assigning students to different types of schools or classes by ability creates more homogeneous classes that are easier to teach (Lazear, 2001). On the other hand, peer groups may have a large effect on student performance, and the students placed in lower-ability tracks may suffer from not being exposed to high-ability peers. There is a substantive literature on streaming mostly related to streaming at the middle school level, the results of which indicate that streaming does not provide much improvement in efficiency.³ Moreover, at least some of the literature finds that the earlier streaming takes place, the more important

³ See Betts (2011) for a review of the earlier literature. There is also an adjacent literature on the impact of vocational education relative to more general, academic education on outcomes for children, i.e. without an intergenerational focus (Hanushek et al., 2017; Bertrand, Mogstad and Mountjoy, 2021; Silliman and Virtanen, 2022).

family background becomes, with students from low SES backgrounds performing better and students from high SES backgrounds performing at similar levels if the tracking age is delayed (Woessmann, 2009). Dustmann and Schönberg (2012) find a strong connection between parental background and the choice of children's secondary track in Germany, which substantively affects subsequent educational achievements and contributes to the low intergenerational mobility in education in Germany. Notably, tracking started at the age of 10 in the German states analysed.

As Betts (2011) points out in his review, different papers in the literature on streaming reach quite different conclusions because of differences in methodology, definitions of streaming, and outcome measures. These differences are highlighted in a pair of papers that take advantage of a reform in Finland in the 1970s in which the age of streaming was shifted from age 11 to 16 in a geographically disparate way that allows for effective identification of impacts. Pekkarinen (2008) uses the reform to examine the impact of later streaming on university attendance, finding that it had significant negative effects for boys from low SES backgrounds and small positive effects for girls. Pekkarinen attributes this pattern to differences in puberty – streaming later is better for girls, who have already gone through puberty, than for boys who undergo the confusion induced by puberty at later ages. In apparent contrast, Pekkarinen, Uusitalo and Pekkala Kerr (2009) find that the reform increased intergenerational income mobility. The apparently different conclusion may arise because – as we will see – vocational education tends to be associated with lower mobility for those from the middle of the income distribution but an increased movement into the middle for boys from lower-income and lower-education backgrounds. This highlights the importance of considering heterogeneity in effects (particularly by family background and gender) and the need to use disaggregated measures that can capture different effects in different parts of the income and education distributions. We focus on both of these considerations in our empirical work.

The closest paper to ours in terms of empirical work is Brunello and Checchi (2007), who also examine the impact of tracking on earnings and education outcomes using international data. They find that earlier tracking generally reinforces the advantages of higher SES family background on educational attainment and earnings (i.e. it increases intergenerational persistence in inequality). They do not break down results by gender or show mobility impacts in different parts of the distribution, which, to repeat, we show are of central importance.

4 | DOES A RISING TIDE RAISE ALL BOATS?

Given that the majority of people in many developed economies do not obtain a post-secondary degree, a pre-requisite for education policy to reduce inequality is that it somehow benefits even people from lower SES backgrounds who do not get a university degree. That is, following the Rawlsian rule, education systems need to generate outcomes that are to the good of all. One way that education policy could have this effect is found in standard neoclassical theory. In a classic depiction of increases in returns to education in the US in the 1980s, Katz and Murphy (1992) argue for a skill-biased demand shift driven by exogenous changes in technology stemming from the computer revolution. In that context, increased education for some reduces competition in lower-educated labour markets, raising the income for others, distributing the benefits of technological change more broadly. In the realm of self-respect and social respect, it says that the more-educated do not have the rights to better incomes and positions as a result of technological change. They have to accept the outcomes of increased competition for those advantages.

Many developed countries have, in fact, greatly increased the level of education in their population. In Figure 1, we plot the proportion of adults aged 25–59 in 1990, 2000 and 2019 with an ISCED level 6–8 education (a Bachelor's degree or above) for the set of advanced countries that are part of the Country Studies project that is parallel to the IFS Deaton Review. University education attainment increased dramatically across all 17 countries, averaging at a 39 per cent increase from 1990 to 2000 and 83 per cent over the ensuing two decades. In many of the economies, the post-2000 era,

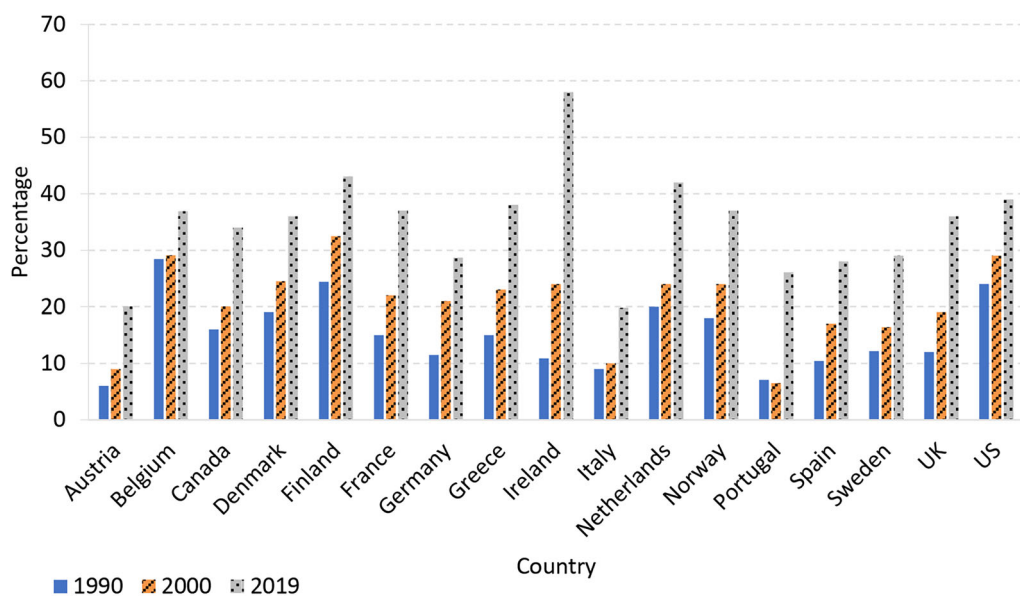


FIGURE 1 University education by country. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1111/1475-5890.12394)]

in particular, was an era of rapid educational change. These increases were matched with substantial declines in the percentage with ISCED level 0–2 education (roughly equivalent to high school drop-outs).

Did these educational expansions act to reduce educational earnings differentials, as hoped? Blundell, Green and Jin (2022) examine this question for the United Kingdom where a substantial educational reform in the 1990s led to a surge in university attendance from only 13 per cent of working-age adults having a university degree in 1990 to over 30 per cent having a degree by 2010. Yet from 1995 to 2010, the ratio of the hourly wage of university degree holders to ‘high school graduates’ did not change.⁴ And the UK is not alone in this pattern. Blundell et al. (2022) examine OECD data on education and wages, showing that 11 other OECD countries experienced similarly large increases in the proportion of working-age adults with a university degree in the same time period. Of those 11 countries, seven experienced no statistically significant (or economically substantial) change in the wage differential between tertiary and upper secondary educated workers between 2000 and 2010, two experienced a statistically significant decline in the differential, and two experienced a statistically significant increase. It is worth recalling that substantial increases in college attainment in the US in the 1980s were matched by large increases in the college wage premium. Contrary to the predictions of a standard model, it seems that the pairing of sizeable increases in university education levels with declining university wage premia is, if anything, a rare occurrence. Moreover, in the US case in the 1980s, the increase in the education wage differential was generated by a combination of relatively little movement in the real wage for university-educated workers and a decline in the real wage for the high school educated (Card and DiNardo, 2002; Beaudry and Green, 2005). But the standard model with an exogenous skill-biased demand shift would imply an increase in the wage for the university-educated, with the wage of lower-educated workers also increasing (though possibly at a lower rate). The actual patterns, instead, indicate that educational increases have not served to distribute the benefits of technological change to lower-educated workers.

⁴ High school graduates are defined as people who received a grade of least C in the General Certificate of Secondary Education (GCSE); these are exams in the UK that students take at age 16 after 11 years of formal schooling.

A potential explanation for these patterns is found in models of endogenous technological change in which increases in education either cause inventors to innovate in the direction of technologies that are complementary to high-educated workers (Acemoglu, 1998) or cause firms to choose technological options that are complementary to the expanded set of high-educated workers (Beaudry and Green, 2003). In these models, an increase in educational attainment invokes shifts in technologies (and demand) in favour of more-educated workers. Depending on the relative supplies of human and physical capital, this can lead to either increases or no change in education wage differentials. Indeed, if the availability of physical capital is sufficiently constrained, the movement of firms into more skill-intensive production technologies effectively moves capital away from working with low-skilled workers, causing their wages to fall (Beaudry and Green, 2003; Carneiro, Liu and Salvanes, 2022). Instead of an increase in education being to the benefit of lower-educated workers, it induces technological changes that are, at best, neutral and at worst detrimental to those workers, reducing their labour market options.

These findings have important implications for our justice-based considerations. They imply, in part, that an education expansion policy is not necessarily a silver bullet that both makes the economy more productive and reduces inequality. It undoubtedly does the former, but when technological choice is endogenous, it may not do the latter – and the experience of a wide set of developed economies suggests that it has not served to reduce earnings differentials. This weakens any claim that increased educational spending is to the benefit of all. Moreover, if raising the proportion of workers with a university degree causes a shift towards firms using technologies that favour more-educated workers, then increasing educational spending creates a labour market that gives more and more priority to education. This is not necessarily a bad outcome unless it serves to reinforce an unequal meritocracy in which both the income and respect benefits of education go to the children of high SES parents. In that case, education and technological change are not so much independent entities engaged in a race as two elements in a complex system in which changes in education can alter the path of technological change and the two together can lead to increases or decreases in the justness of society. A key element of that complexity is the specific form of education systems – whether they focus on access to university or trades-type education, for example. This is an element that is, so far, missing from our models of education, technology and inequality. In the remainder of this paper, we examine the relationship between the different forms education policy can take and inequality, in general, and intergenerational persistence in income and educational status, in particular.

5 | INTERNATIONAL EVIDENCE ON THE RELATIONSHIP BETWEEN DIFFERENT EDUCATIONAL SYSTEMS AND INEQUALITY OUTCOMES

Our discussion to this point has highlighted the potential importance of intergenerational persistence in income and in educational access for deciding whether education systems are part of reducing inequality or, instead, part of building unequal meritocracies. In this section, we ask the question whether different educational systems are associated with more or less intergenerational income and educational persistence. We are interested in whether building a system that provides more opportunities in the middle of the educational ranking (training in a trade, for example) is associated with lower persistence in income than, say, a system that focuses its attention on university education. In what follows, we do not pretend to provide a causal estimate of the impact of adopting different educational systems on intergenerational persistence. Indeed, it seems quite possible that such an estimate does not exist since different educational systems reflect the culture of the country where they are implemented in deep ways. We would not expect, for example, that the US could simply switch to the German educational system. But associations between different educational systems and different inequality outcomes could raise intriguing possibilities about where the failings and promises of different systems may lie.

The first step in our investigation is to establish a set of measures for characterising key features of the educational systems. We chose some standard measures of school systems along with measures that reflect our interest in the extent to which different systems have varied options for students, and insights from the literature (e.g. the fact that age at which streaming starts can matter; Woessmann, 2009; Dustmann and Schönberg 2012). We constructed both using maps of country education systems included by the OECD in their *Education at a Glance* publications starting in the early 1990s. The maps show different levels (matched to ISCED levels), entry points, exit points, and different streams by age. The first such maps were part of the 1993 *Education at a Glance* publication. The maps were subsequently updated and are part of the OECD's *Education GPS* database. We make use of the 1993 map because some of our intergenerational mobility measures pertain to the 1980 birth cohort and the 1993 maps represent the system that cohort faced when it was in secondary school.⁵

We constructed the following eight measures.

- Age starting pre-primary: the age at which a child first enters the educational system.
- Age at which primary school starts: often (but not always) the same as the age at which compulsory schooling starts.
- Age compulsory school ends: the youngest age at which a student can leave schooling.
- Years in primary: the number of years that are considered primary schooling.
- Number of streams at compulsory school end: the number of educational streams the system has split into by the time a student reaches the compulsory school-leaving age.
- Age of first exit point: age at which the first recognised allowable exit occurs (i.e. the first age at which a student could leave schooling with some form or credential or diploma).
- Number of streams at ISCED level 3: the number of streams when a student is in ISCED level 3 – as compulsory school ending is often in ISCED level 3, this often (but not always) takes the same value as the number of streams at compulsory school end.
- Age when system first streams: this variable captures how early in a system streaming occurs.

In Figure 2, we plot histograms of the streaming-related measures from 1993. We define streaming as an educational pathway that would typically lead to a credential that is distinct from the credentials obtained through other streams. The figure reveals considerable variation in these measures. Notably, the plot for 'Age where system first streams' shows a split into three types of systems: one that puts students into streams quite early (by ages 10–12); another – the largest group – where streaming starts happening during secondary school; and a third group where streaming does not happen until after secondary school (consisting of the US and Canada). This bunching raises the possibility that there are a few over-arching types of systems related to streaming.

To examine this possibility further, we carried out a principal component analysis (PCA) of our set of system characteristics. In PCA, a first component is chosen as the linear combination of the underlying variables to explain the maximum amount of variation in those variables across the countries. A second (orthogonal) component is chosen to explain the maximum variation remaining after accounting for the first component, and so on. In our case, the first component explains 64 per cent of the total variation. To represent what that first component captures, in Figure 3 we plot the correlation between that component and each of the underlying variables. The key elements of the first component are the number of streams at the end of secondary school (which is strongly positively related to the component) and the age when streaming starts (which is negatively related). Years in primary school also has a strong negative correlation with the component and is likely capturing the same feature as the age when streaming starts, as streaming happens mainly in secondary school.⁶

⁵ The education database including the maps can be accessed at <https://gpseducation.oecd.org>. Details on the creation of our variables from the maps can be found in Bennett et al. (2024).

⁶ The second component accounts for 27 per cent of total variation. Its associations are scattered in a way that makes it difficult to interpret and we do not use it in the discussions in this paper.

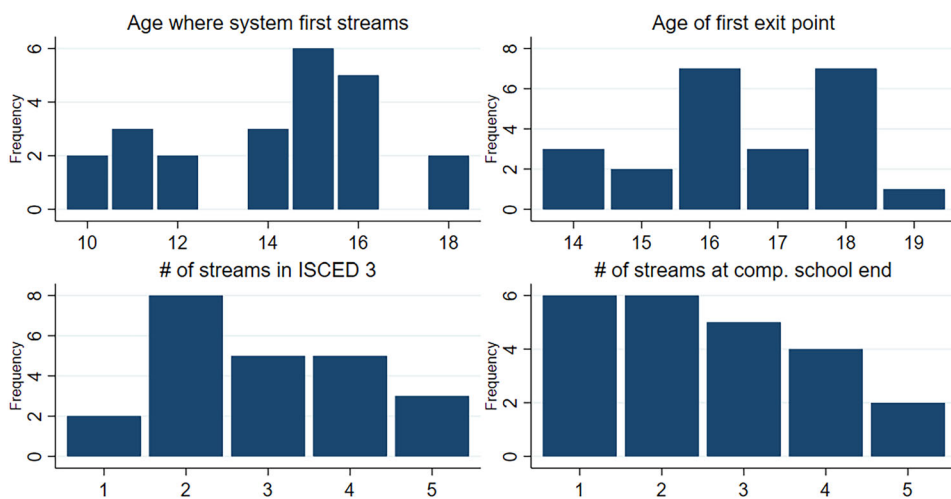


FIGURE 2 Country distribution of streaming and age of first exit characteristics, 1993. [Colour figure can be viewed at wileyonlinelibrary.com]

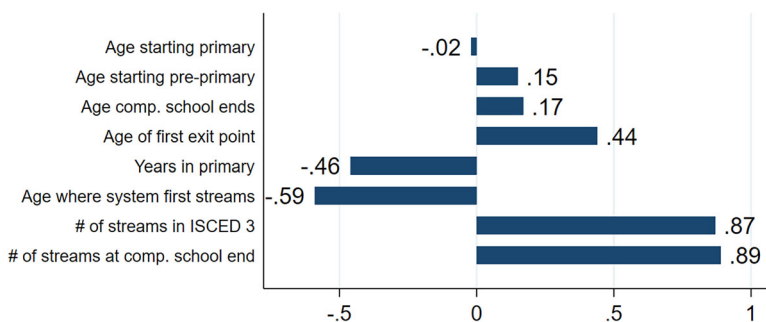


FIGURE 3 Streaming factor correlations with underlying variables. [Colour figure can be viewed at wileyonlinelibrary.com]

Thus, the first component is associated with more streams and with streaming happening at earlier ages; thus, we refer to it as the ‘streaming factor’. In later figures, we will see that there are clear groupings of countries with high values for the streaming factor (Austria, Belgium and Germany) and very low values (Canada, the US, and arguably Finland). The remainder of the countries are scattered in between these two extremes. This is the main takeaway from our systems analysis exercise: streaming at the secondary school level differentiates at least two sharply different educational systems. We move now to investigating how those two systems relate to intergenerational mobility in education and income.

6 | INTERGENERATIONAL MOBILITY AND SCHOOL SYSTEMS

6.1 | PIAAC data

At the centre of our investigations of intergenerational educational and income mobility is a survey conducted in over 40 OECD countries under the PIAAC. The survey was conducted in 2011/12 in the

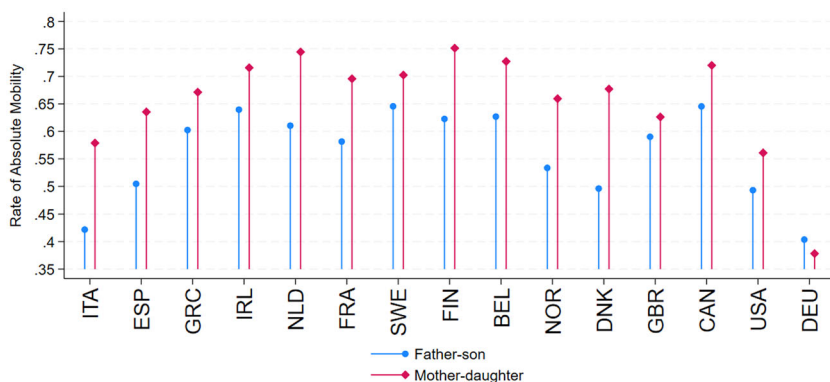


FIGURE 4 Absolute educational mobility: proportion of sons with higher education than their fathers and daughters with higher education than their mothers. *Source:* PIAAC. [Colour figure can be viewed at wileyonlinelibrary.com]

various economies and included a consistent set of questions testing literacy and problem-solving in the language(s) of the specific country. Importantly, for our purposes, it also included a set of questions on the education of the respondents and of their parents, permitting measures of intergenerational educational mobility in a consistent way across countries. We focus on countries involved in the Country Studies project carried out adjacent to the IFS Deaton Review in order to link better with other parts of the study and to keep the focus on developed economies. There are approximately 5,000 observations (individuals aged 16–65) in each country’s survey.⁷ Among those, we select adults aged 30–39 as the ‘children’s’ generation, who were born in the late 1970s to early 1980s and would largely have faced the school systems depicted in our 1993 OECD education maps during secondary school ages. Their parents vary in age but were generally born in the 1940s and early 1950s. Parental education is recorded in three levels in the PIAAC: low (primary or lower secondary education; ISCED 0–2); middle (upper secondary education or post-secondary non-tertiary education; ISCED 3–4); and high (tertiary education; ISCED 5–8). We use the same categories for the children’s generation in order to construct consistent mobility patterns. We also drop immigrants (anyone in the children’s generation not born in the specific country) in order to make sure we are focusing on people who went through the country’s education system.

We capture the extent of intergenerational mobility in education using a measure of absolute mobility. We define absolute mobility as a child having a higher level of education than their parent – see Narayan et al. (2018) for a discussion of definitions and assumptions related to mobility measures – and we plot the rates of absolute mobility in Figure 4. In the figure, countries are ranked based on the proportion of fathers in the low-education category, with the left bar showing father–son mobility and the right bar showing mother–daughter mobility for each country. The absolute mobility measure is imperfect as sons with low-educated fathers have two categories they can move up to (middle and high) while sons of high-educated fathers necessarily contribute zero to mobility. Remarkably, in spite of this, Italy and Spain – the countries with the highest proportion of low-educated fathers – have some of the lowest absolute mobility rates. Similarly, Germany has a high proportion of the fathers’ generation in the middle category, yet has the lowest absolute mobility across all the countries – much lower than a country such as Canada, which has a relatively high proportion of fathers in the high category. Mothers tend to have lower education than fathers while, in the children’s generation, the daughters are more educated, so there is a higher level of mobility

⁷ Specifically, we work with the surveys for Belgium (Flanders), Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, the UK and the US. The Greek survey was conducted in 2014–15. Portugal is not in the public-use version of the PIAAC and the Austrian data do not include the gender of the child and so we do not include either of these.

for daughters. However, the cross-country patterns of mobility are similar to those for sons. The key exception is Germany, where upward mobility is actually slightly lower compared with sons.

In Figure 5, we plot detailed categories of education levels for sons grouped by their father's education levels for six specific countries.⁸ The top panels show mobility patterns underlying the absolute mobility measure for the two countries with the lowest values of that measure: Italy and Germany. Overall, the Italian system is very intergenerationally rigid at all levels. Italy has the highest rates of sons being stuck at the bottom, coming from a low-educated family and staying there. At the other end, there is also strong persistence in high education levels at the top of the distribution, while the educational distribution of the sons of middle-educated fathers is more mixed but still shows persistence in that category.

In comparison, Germany gets its low absolute mobility score from a combination of high proportions of sons in middle education, with strong persistence at the top. However, it does a much better job in terms of the mobility from the bottom than Italy, but mainly in terms of moving those sons to the middle education level rather than high education.

The middle panels of Figure 5 present the same plots for two countries with very similar rates of absolute mobility, Canada and Sweden. For Canada, the dominant education level of sons is high education across all levels of fathers' education. This is one of the only countries with this pattern and is the reason that Canada shares the top value for the absolute mobility measure with Sweden. For Sweden, in contrast, high mobility stems from one of the highest rates of moving sons from low-educated backgrounds to middle education.

Finally, the bottom panels of Figure 5 present results for the US and the UK. The US is in the bottom quarter of our countries in terms of our absolute mobility measure while the UK is in the middle of the pack.⁹ The US, like Germany, gets its low mobility score from a low rate of moving the children of low-educated fathers to the high education level (though, as with Germany, it has a good rate of moving sons of low-educated fathers to middle education). What separates the UK from the US is its higher rate of moving sons with low- and middle-educated fathers into the high education level.

6.2 | Types of systems

In Table 1, we present the correlation matrix among a set of factors that have emerged as potentially interesting from our discussion to this point and that are chosen in order to characterise the way education systems can affect opportunity and inequality. They can do this, in part, if they are rigid and tend to reinforce advantages across generations – a direct reflection of the idea of unequal meritocracies. It is worth noting that in the country-specific mobility figures, the probability that the son or daughter of a high-educated parent is themselves high-educated is relatively large (it is the highest probability in all of these plots). In fact, across all the countries we examine, the mean probability that the son of a high-educated father is himself high-educated is 0.67, and ranges from a low of 0.52 to a high of 0.88. Thus, all of these education systems exhibit strong persistence at the top. This is particularly true of the countries with high shares of fathers who are low-educated. As shown in the last row of the second column of Table 1, the correlation between the proportion of fathers who are low-educated and the probability that the son of a high-educated father is high-educated is 0.77. Thus, the economies with the highest proportion of fathers who are low-educated – Italy and Spain – appear to have particularly rigid educational systems at all levels.

⁸ Results for mother–daughter pairs are similar.

⁹ Interestingly, the gap between the percentage of children from families with annual incomes over \$100,000 attending university and the same percentage for children from families with annual incomes under \$20,000 in the US is triple that for Canada (Bellei, Frenette and Lochner, 2014). With both countries having high post-secondary spending and post-secondary institutions that are legally open to all, this highlights the fact that the specific form of educational systems matters.

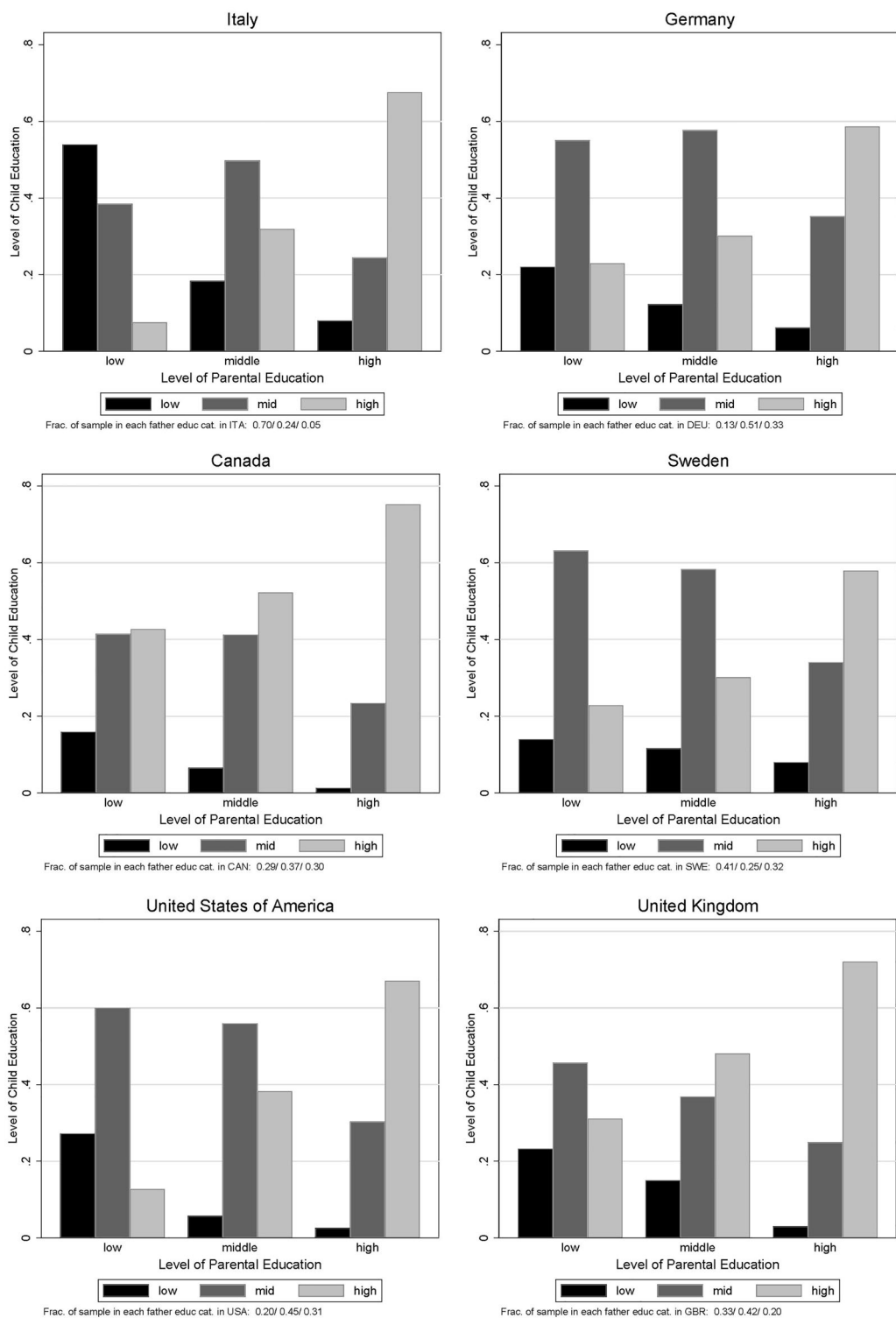


FIGURE 5 Education levels of sons by father’s education level, detailed margins for specific countries. Source: PIAAC.

TABLE 1 Educational mobility and streaming: sons.

	(1)	(2)	(3)	(4)	(5)
(1) Streaming factor	1				
(2) Percentage of fathers with low education	-0.029 (0.92)	1			
(3) Percentage of sons with middle education when father is low-educated	0.37* (0.17)	-0.69* (0.004)	1		
(4) Percentage of sons with high education when father is low-educated	-0.33 (0.23)	0.53* (0.04)	-0.91 (0.23)	1	
(5) Percentage of sons with high education when father is high-educated	-0.002 (0.99)	0.77* (0.001)	-0.25 (0.37)	0.21 (0.44)	1

Note: Standard errors in parentheses. An asterisk denotes statistically significant at the 5 per cent level. The column numbers correspond to the row numbers and represent the same respective variables. The mobility measures are calculated as the proportions of each type minus the proportion of sons in the given category. For example, we compute the proportion of sons of low-educated fathers who are themselves middle-educated minus the proportion of all men in the son's generation who are middle-educated. *Source:* Calculations from PIAAC data.

The second way an educational system can affect inequality and mobility is through opening up opportunities. For people from low-education backgrounds, that opportunity could be about opening up skilled trades type options or opening up access to a university education. The streaming factor from our analysis of education system characteristics (factor 1) potentially reflects the first of these channels. Fitting with this, from Table 1, countries with higher values of the streaming factor tend to have higher probabilities of sons of low-educated fathers being middle-educated.¹⁰ We also examined the relationship between the streaming factor and the fields of study in the middle education level (i.e. non-university post-secondary education) in order to investigate whether streaming tends to open up more technical opportunities. To do that, we created a measure of the proportion of sons in the PIAAC who are in the middle education level and whose field of study is listed as 'engineering, manufacturing, and construction'. That measure, not shown in the table, has a correlation of 0.42 with the streaming factor, with Germany being notable for having high values of both and the US being notable for the opposite.

The other channel through which an education system can affect mobility and inequality is through opening up opportunities for children of low-educated families to move into high education (variable 4 in Table 1). It is interesting that the probability that a son of a low-educated father is high-educated (the measure that most closely captures this channel) is negatively related to both the streaming factor and the probability that the son of a low-educated father is middle-educated. It appears from this that educational systems either open up access to skilled trades type jobs (doing this through creating associated streams in secondary school) or open up access to universities – not both. We call the systems that put an emphasis on secondary school streams and access to skilled trades the 'blue collar' school systems (epitomised by Germany), and the systems that put an emphasis on access to university the 'reach for the top' school systems (epitomised by Canada and Finland). The countries with a large proportion of fathers with a low education are particularly poor in the blue collar dimension and also have a particularly strong rigidity at the top.¹¹ In the next subsection, we investigate the relationship between the measures that help define these systems – the streaming measure, the probability that the child of a low-educated parent moves to the middle education level, the probability that the child

¹⁰ Note that the transition probabilities in Table 1 are 'excess' probabilities formed by subtracting the proportion of sons in each category from the transition probabilities. For example, we compute the proportion of sons of low-educated fathers who are themselves high-educated minus the proportion of all men in the son's generation who are high-educated. This better captures the extent to which there is persistence in high education in families as opposed to random assignment to high education for sons in a country where a large proportion of people happen to be high-educated.

¹¹ In Bennett et al. (2024), we report the analogous correlations to Table 1 for daughters. The patterns are broadly similar.

of a low-educated parent moves to the high education level, and the probability that the child of a high-educated parent is high-educated – and measures of income inequality.

6.3 | Associations between income inequality and education systems

Next, we investigate of the relationship between our streaming factor and measures of intergenerational income mobility. We are interested in a nuanced depiction of mobility that differentiates between movements from the bottom of the parental income distribution to the middle versus the top of the child's income distribution rather than a single number intended to capture mobility of all kinds. Unfortunately, there is no source for such measures for all of the countries in our study, so we generate a rough measure using the PIACC data and focusing on monthly earnings rather than total income. In particular, we assume that fathers who are in the low-education category were in the bottom half of their earnings distribution and compute the probability that sons or daughters of low-educated fathers have earnings that place them in either the third or fourth quintile of the child's generation earnings distribution (representing the upper middle of the distribution) or the fifth quintile (representing the top).¹² The quintiles correspond to the conditional (on working) earnings distribution. In Bennett et al. (2024), we also present the relationships between the streaming factor and the probability that a son or daughter is employed: the sons show a weak positive relationship and the daughters show a weak negative relationship.

In Figure 6, we plot the streaming factor value against the probability that the child of a low-educated father is in the third or fourth quintile of their earnings distribution by country. The left panel plots this for daughters and the right panel plots this for sons. We focus on the father's education in both cases because women in the parents' generation had less variation in their education. The plots show an interesting difference by gender: for sons, more streaming in the education system has a mild positive correlation with upward mobility to the upper middle of the distribution while for daughters the relationship is negative. The result for sons contrasts with the earlier result that streaming is positively associated with the sons of low-educated fathers getting a middle education. Thus, streaming seems to help with completing high school, but this does not have a strong relationship with subsequent earnings. In Figure 7, we repeat this exercise for transitions to the fifth quintile of

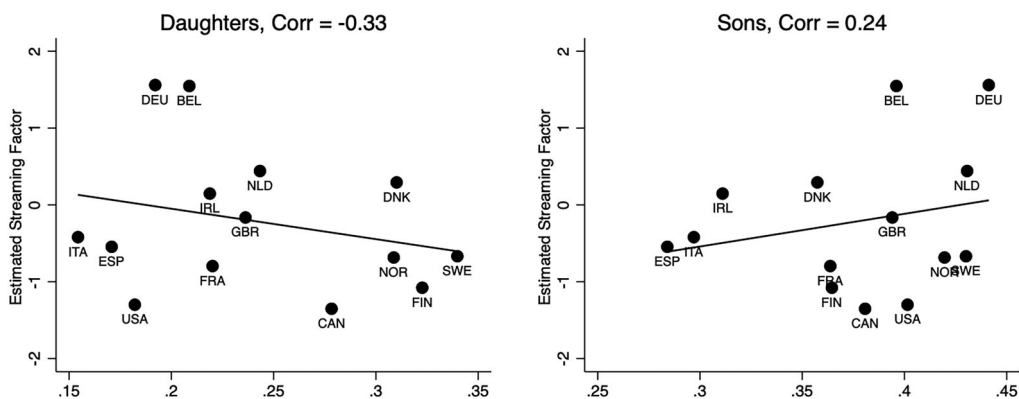


FIGURE 6 Plots of streaming factor versus the probability that the child of a low-educated father is in the third or fourth quintile of their earnings distribution.

¹² Note that in the World Bank's Global Database on Intergenerational Mobility (GDIM), most countries do not have true longitudinal income data, so parental income is computed based on their education (GDIM, 2023). Our approach is the same, except that we make the connection to parental education transparent. We drop Greece for these exercises because Greece had a sizeable share of employed individuals with a missing value for their earnings decile.

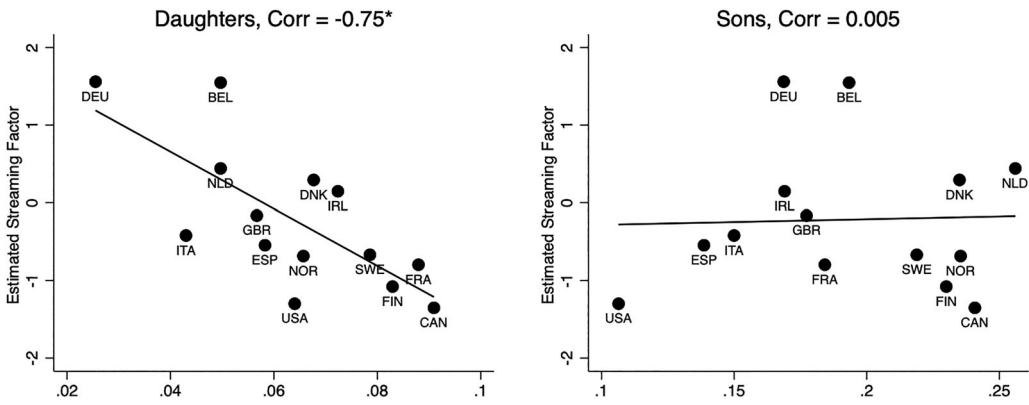


FIGURE 7 Plots of streaming factor versus probability that the child of a low-educated father is in the fifth quintile of their earnings distribution.

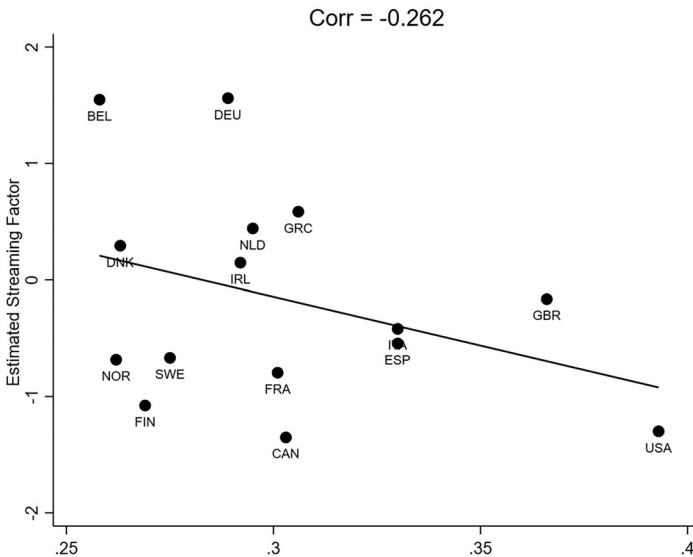


FIGURE 8 Plot of streaming factor versus Gini coefficient.

the child’s distribution. The correlation is non-existent for sons but becomes strongly negative for daughters; that is, streaming has little impact on earnings for sons but seems actually detrimental for daughters.

In Figure 8, we plot the streaming factor against the Gini coefficient for disposable household income by country. The Gini coefficient comes from the Country Studies project, with each participating country contributing a Gini value constructed to be directly comparable across countries. The plot shows a weak negative relationship between the two, though this may hide opposite direction effects for sons and daughters of the type seen in Figure 6.

The other key feature of educational systems that we have seen is the extent to which they enable movements from low education in the parents’ generation to higher education in the children’s generation. In Table 2, we present cross-country correlations between measures of those movements and our measures of intergenerational earnings mobility. The first column shows correlations for daughters, which indicate that education systems with high rates of movements from the bottom (for

TABLE 2 Education and income intergenerational mobility.

Earnings mobility	Father to child education mobility: percentage of children high-educated given father low-educated	
	Daughters	Sons
Bottom half to non-employed	-0.56* (0.028)	0.022 (0.37)
Bottom half to quintile 3 or 4	0.73* (0.002)	0.095 (0.73)
Bottom half to quintile 5	0.64* (0.01)	0.60* (0.02)

Note: Standard errors in parentheses. An asterisk denotes significant at the 5 per cent level. *Source:* Calculations from PIACC data. 'Earnings' mobility measures are from PIACC and show the proportion of children who are either non-employed or in certain quintiles of the conditional (on working) earnings distribution given that their father is low-educated and therefore assumed to have low earnings.

fathers) to the top (for daughters) of the education system are associated with lower probabilities of the daughters not working and higher probabilities of them being in the upper middle or top of their own conditional (on working) earnings distribution. For sons, in contrast, the correlations between educational and earnings mobility across generations is weaker in terms of reducing non-employment or moving to the upper-middle part of their earnings distribution but is still positively correlated with them moving to the top of their earnings distribution. What appears to be emerging is that systems that focus on moving children from the bottom of the education ranking to the middle have negative associations in terms of earnings outcomes for daughters while systems putting more emphasis on movements from the bottom to the top of the education ranking are associated with better employment and earnings outcomes for daughters. Both systems are neutral for sons in terms of employment and mid-level earnings outcomes. Recall that the high streaming systems that are associated with movements to the middle of the education ranking seem to be negatively related to the extent of bottom to top mobility; that is, countries generally seem to pursue one of these approaches or the other rather than, say, some countries being good at both and others good at neither.

In Figure 9, we plot our main upward mobility measure (the probability that the child of a low-educated father is high-educated) against the value of the streaming factor by country, showing the value of the Gini coefficient for household disposable income for each country alongside its name. The left panel uses the mobility measure for daughters while the right panel use the measure for sons. The left panel reveals the negative correlation between the mobility and streaming measures that we noted before (a correlation that rises from -0.21 to -0.53 for daughters if we drop the US and Italy, the two main outliers from the generally negative relationship). At the bottom right of the figure, Germany stands out as having a high value for the streaming measure but low educational mobility for daughters. In the upper left, Canada and Finland have the opposite combination. The country Gini coefficients are generally lower at the two ends of that diagonal (i.e. with countries that adopt one main approach or the other). The US and, to some extent, Italy and the UK stand out as being low in both the streaming and mobility dimensions, and they represent the three highest Gini values. That is, inequality seems to be positively associated with lower streaming (which tends to be associated with better educational mobility for sons) and lower upward educational mobility (which tends to be associated with better earnings mobility for daughters). The right panel shows that the same broad pattern holds for sons, though the UK does much better in terms of the educational mobility of sons than daughters.

We examine these associations further by running regressions of the Gini coefficient on our streaming factor, the bottom to top educational mobility measure, and the probability that children of a high-educated father are themselves high-educated (which we see as capturing systems that are rigid in terms of preserving educational privilege). For these regressions, we use the Gini coefficient for

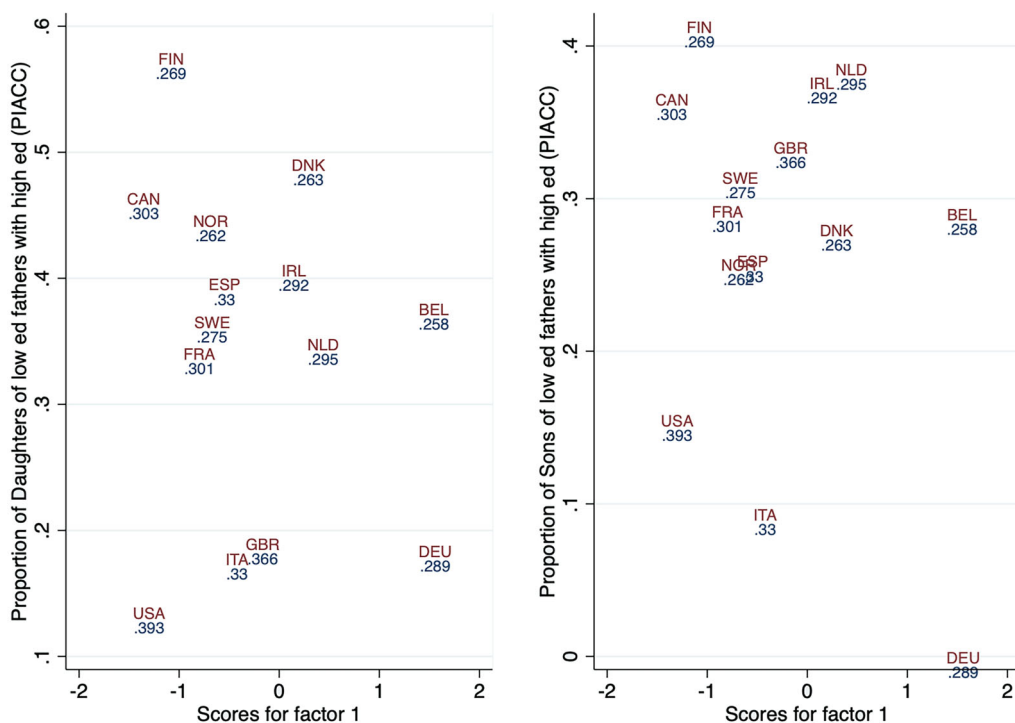


FIGURE 9 Probability of the child of a low-educated father being high-educated versus streaming factor, with Gini values. [Colour figure can be viewed at wileyonlinelibrary.com]

gross individual earnings for females (in the regressions using daughter-related mobility measures) and for males (in the regressions using son-related measures). The measures were constructed as part of the Country Studies project. In the earlier figures, we used the Gini for household disposable income to capture overall inequality. Here, we focus on individual earnings to try to capture links between education systems and inequality that do not reflect the (direct) redistributiveness of the fiscal system.

We report these results in Table 3, with the first two columns containing regressions using daughters' mobility measures and the next two columns using sons' mobility measures. Column 1 shows that the streaming factor and the low to high education mobility measure both have negative relationships with the Gini (as expected), with the latter being significant at the 5 per cent level. The high to high mobility measure also has a negative (and insignificant) effect. Interestingly, if we use the disposable income Gini instead of the earnings Gini, the high to high mobility measure enters positively and statistically significantly. Thus, more rigid (at the top) systems are associated with lower levels of redistribution, perhaps through a political economy channel. Standardised versions of the coefficients (not shown) reveal that a 1 standard deviation increase in the streaming factor is associated with a 0.27 standard deviation fall in the Gini while the low to high mobility measure has a standardised coefficient of -0.61 , so the low to high mobility measure has the strongest association with inequality. As we saw in Figure 9, the countries with low streaming and low bottom to top educational mobility – notably, the US and Italy – are the countries with the highest income inequality. In Column 3, the system measures have associations with inequality that are in the same direction and of similar magnitude for sons. In Columns 2 and 4, we add in our measure of the starting age for pre-school in an attempt to reflect the considerable evidence of the importance of early childhood education (Attanasio, Cattani and Meghir,

TABLE 3 Regressions of income inequality on education systems measures.

	Gini coefficient			
	Daughters (1)	Daughters (2)	Sons (3)	Sons (4)
Streaming factor	-0.015 (0.013)	-0.015 (0.014)	-0.022* (0.014)	-0.025* (0.014)
Education: low to high	-0.27** (0.11)	-0.27** (0.12)	-0.26* (0.13)	-0.25* (0.12)
Education: high to high	-0.053 (0.090)	-0.057 (0.04)	-0.057 (0.096)	-0.053 (0.096)
Pre-school entry age		-0.0007 (0.012)		-0.0007 (0.012)
R^2	0.50	0.50	0.40	0.40
Number of observations	14	14	14	14

Note: Standard errors in parentheses. * and ** denote statistically significant at the 10 and 5 per cent levels, respectively. The mobility measures are calculated as the proportions of each type minus the proportion of daughters in the given category. For example, we compute the proportion of daughters of low-educated fathers who are themselves middle-educated minus the proportion of all women in the daughter's generation who are middle-educated. Source: Calculations from PIACC data.

2022). The fact that the estimated effect is small likely implies that our measure does a poor job of capturing early childhood education elements of educational systems.

Taken together, we view these data as providing suggestive evidence that the form of the education system matters. Systems that open up more opportunities – either through options for training in trades or access to university degrees – tend to do better in terms of inequality.¹³ Systems that have a ‘country club’ element to their education systems (i.e. where the sons and daughters of the highly educated are much more likely to be highly educated) also do poorly in terms of inequality (as measured by inequality of household disposable income). And the countries that do poorly in all dimensions – providing few channels for mobility and having persistence at the top – stand out as countries with high income inequality. This does not necessarily imply that inequality would fall in the high-inequality countries if they broke up the ‘country club’ or adopted one of the types of education systems that provide more mobility options. But it does indicate that the inequality in those countries extends beyond inequality in income alone to inequality in educational opportunities that are likely to be deeply related to feelings of self-efficacy and to the sense of the justness of their society held by members of the society.

7 | EXAMINING RESPECT WITH HOMOGAMY MEASURES

In our discussion of the justice-centred goals of education policy, we have argued that focusing on the promotion of self-respect and social respect is a way to operationalise concepts of justice that reaches across different theories. One potential measure of that respect can be found in marriage patterns, with the argument being that a measure of respect between two groups is their willingness to have their children marry each other. For that reason, we turn to examining the relationship of different

¹³ Of course, early streaming could have the opposite effect – locking students into particular education paths that may not be the best match for their abilities, and increasing the impact of parental background. Dustmann, Puhani and Schönberg (2017) provide results in the context of the German system, showing that the impacts of early streaming can be mediated by opening later transition routes across streams.



FIGURE 10 Probability of a female high school drop-out marrying a secondary- or more-educated man versus streaming factor. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1111/1475-5890.12394)]

educational systems to educational homogamy – the tendency of people to marry a person from their same educational group.¹⁴

We use data on marriage patterns from a variety of sources, all focusing on marital patterns of people under the age of 40 in the early 2000s.¹⁵ These would be people who would have faced the educational systems we capture in the 1993 OECD country maps or earlier versions. Some of this same age group would be among the children's generation in our intergenerational education measures.

We plot a measure of inter-education-group marriage against our measure of the extent of streaming in an educational system in Figure 10. Specifically, our inter-group marriage measure is the proportion of wives whose education is below secondary completion (with or without basic vocational training) who are married to husbands whose highest education level is either completed secondary or university. Because the rate at which women from a particular education group can marry men from another group depends on how many of those men there are, we subtract the proportion of men whose highest education level is either completed secondary or university. That is, we measure whether lower-educated women have a probability of marrying a more-educated husband that is above or below what that probability would be if they matched with husbands randomly with respect to education. Note that this measure takes a negative value for all countries, implying that the least-educated women have a low likelihood of marrying more-educated men in all countries.

Figure 10 shows a strong positive relationship between the extent to which education systems stream students in the middle levels and the extent of upward marrying of low-educated women. Recall that more streaming tends to be associated with more intergenerational educational mobility for boys. Figure 10 shows that this is, in turn, associated with a greater tendency of cross-marriage between the low and middle parts of the education distribution. This makes sense to the extent that the boys moving up due to streaming still have contacts with the girls from their parents' education group. In our interpretation, it also suggests that there is a maintaining of respect for members of the lower education group.

¹⁴ The sociology literature uses homogamy as a measure of the 'openness' of a society (Schwartz and Mare, 2005; Domanski and Przybysz, 2007). Our argument is that less open societies are ones where people in different education groups are less likely to respect members in other groups in the sense of seeing them as equals.

¹⁵ The data are taken from tables in Domanski and Przybysz (2007) (for the European countries), Halpin and Chan (2003) (for the UK), Schwartz and Mare (2005) (for the US) and Hamplova and Le Bordais (2008) (for Canada). No data were available for Italy.

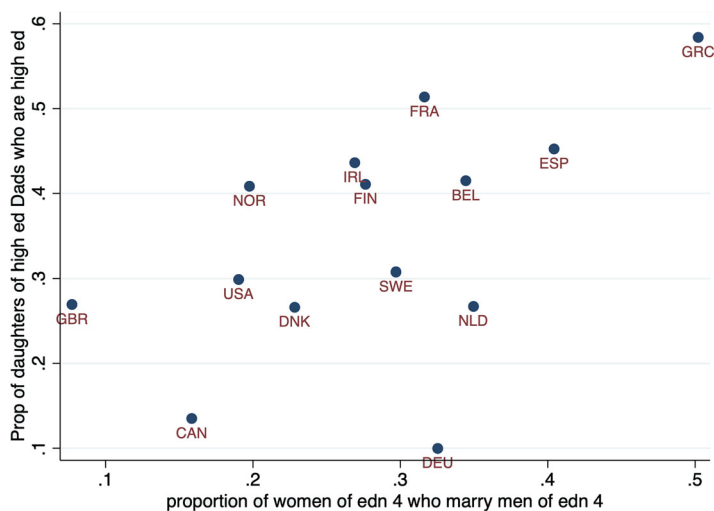


FIGURE 11 Probability of a university-educated woman marrying a university-educated man versus the probability that the daughter of a high-educated father is high-educated (excess measure). [Colour figure can be viewed at wileyonlinelibrary.com]

In Figure 11, we focus on homogamy at the top, that is, the probability that a university-educated woman marries a university-educated man. Again, we subtract off the proportion of men who are university-educated in order to create a relative measure. In this case, the measure values are all positive – high-educated women are disproportionately likely to marry someone from their education group. This measure, as the graph shows, has a strong positive correlation with the probability that daughters of high-educated fathers are themselves high-educated. Thus, systems that are rigid in the sense that high-education status is passed on across generations also tend to be ones where the high-educated marry each other. In our outlook, this suggests lower respect for others outside their education group. A positive correlation between lack of mobility and homogamy at the top is not surprising but it is worth noting that there is no necessary relationship between the two. A system could be rigid in terms of movements across education levels but still have opportunities for inter-marriage (Katrnak, Fucik and Luijckx, 2012). This figure suggests that education systems that protect participation at the top level also tend to be more polarised in terms of social interactions. Interestingly, in a regression of our measure of relative homogamy at the top on the education systems and mobility measures, both the probability of daughters of high-educated fathers being high-educated and the streaming measure enter positively and significantly. Thus, systems that are associated with more inter-marriage between the bottom and the middle are also more associated with the highest-educated keeping to themselves more in marriage. This fits with our earlier results showing that systems such as those in Germany and Austria, which are particularly strong at streaming, are weak at promoting mobility into the highest education level.

We do not claim that these patterns establish a causal link between education systems with more mobility and more streaming and the cross-society respect as reflected in marriage rates. Our argument is that the form of the education system and the cross-generational mobility it either permits or restricts has strong associations with cross-education group marriage. We see those patterns as suggesting that systems that open up more opportunities for educational advancement could be associated with greater levels of cross-society respect.

For our interpretation to be reasonable, it cannot be the case that differences in homogamy across countries reflect mechanical relationships that are not related to openness or respect. Measuring homogamy relative to the marginal distributions of education is a response to one such concern. Another mechanical explanation for higher levels of homogamy is that increases in amounts of

schooling in a society mean that young people are in education longer, and so simply more likely to meet their prospective mate there (Schwartz and Mare, 2005). In our data, however, the streaming variable has small and statistically insignificant correlations with the proportions of people in different schooling levels across countries. The proportion of university-educated women who are married to university-educated men actually has a strong negative correlation with the proportion of people with a university degree (-0.79 with a standard error of 0.001). That is, it tends to be in the societies with more exclusive high education sectors that we see more homogamy at the top (though countries such as Belgium provide clear counter-examples).

The literature on homogamy has investigated various potential driving forces such as the dominant religion in a country, the stage of development, the nature of the welfare regime, etc. (Schwartz and Mare, 2005). We make no attempt to investigate the relative strength of these various channels, just noting that some of them might provide deeper structural reasons for why the educational systems differ across countries.

8 | CONCLUSION

In this paper, we combine a survey of literature with some new data to examine the relationship between education and inequality. Our key conclusion is that increased spending on education is not a silver bullet that will raise productivity whilst reducing inequality. Because of a combination of intergenerational persistence arising from differences in the valuation of education, levels of parental education and budget constraints, simply spending on subsidising higher education may not decrease inequality and could even increase it. The same conclusion arises from general equilibrium considerations when education is allowed to alter investments in technology.

Given the complexity of the relationship between inequality and education, it would not be surprising to find that the specific form that education systems and expansions in those systems take can affect how education policy relates to inequality. We show that systems that open up opportunities have advantageous relationships with inequality, though those relationships vary by gender. Systems that stream students toward vocational training are associated with greater educational mobility for boys. In the case of girls, those same systems have a negative relationship to mobility from the bottom of the parent's earnings distribution to the upper half of the child's distribution. In contrast, systems that are characterised by substantial movements from the bottom of the parental education distribution to the top of the educational distribution for children are associated with good income mobility outcomes for girls but neutral mobility outcomes for boys. Interestingly, no country appears to do well at both (streaming to vocational education and movement from the bottom to the top of the educational distribution). This may be a necessary outcome – it may not be possible to both stream into vocational outcomes and open up real opportunities for a university option for children from low-education backgrounds.

In thinking about the trade-offs among different systems, it is important to consider overall policy goals. We have argued that the goal should be to move towards being a more just society and, further, that providing the bases of self-respect and social respect for all is a relatively general notion of what constitutes a just society. Viewed in the light of that goal, education policy is of central importance. Both the vocational and more university-targeted education systems provide paths to self-efficacy that fit with the goal of providing the bases of self-respect. Both, as it turns out, are associated with increased tendencies for marriage across education groups, which we view as a measure of the extent of social respect in a society.

We do not claim that any of the estimates we present in this paper are causal. Instead, we view our evidence as supporting a claim that there is a complex relationship between inequality of income (and respect) and the construction of education systems rather than a simple, universal relationship. Our evidence may also be helpful in pointing to elements of educational systems that could be useful to investigate further in the battle to reduce inequality.

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DATA AVAILABILITY STATEMENT

The country-level data on the education system components and the intergenerational measures calculated from PIACC are available on request. Please send requests to the lead author.

ORCID

Patrick Bennett  <https://orcid.org/0000-0001-7546-2443>

David A. Green  <https://orcid.org/0000-0002-1222-4963>

REFERENCES

- Acemoglu, D. (1998), Why do new technologies complement skills? Directed technical change and wage inequality. *Quarterly Journal of Economics*, 113, 1055–89.
- Anderson, E. (1999), What is the point of equality? *Ethics*, 109, 287–337.
- Anderson, E. (2007), Fair opportunity in education: a democratic equality perspective. *Ethics*, 117, 595–622.
- Attanasio, O., Cattan, S., & Meghir, C. (2022), Early childhood development, human capital and poverty. *Annual Review of Economics*, 14, 853–92.
- Beaudry, P., & Green, D. A. (2003), Wages and employment in the United States and Germany: what explains the differences? *American Economic Review*, 93 (3), 573–602.
- Beaudry, P., & Green, D. A. (2005), Changes in US wages, 1976–2000: ongoing skill bias or major technological change? *Journal of Labor Economics*, 23, 609–48.
- Becker, G. S., & Tomes, N. (1986), Human capital and the rise and fall of families. *Journal of Labor Economics*, 4, S1–S39.
- Belley, P., Frenette, M., & Lochner, L. (2014), Post-secondary attendance by parental income in the US and Canada: do financial aid policies explain the difference? *Canadian Journal of Economics*, 47, 664–96.
- Bennett, P., Foley, K., Green, D. A., & Salvanes, K. G. (2024), Education and inequality: an international perspective. Institute for Fiscal Studies. Working Paper, <https://ifs.org.uk/publications/education-and-inequality-international-perspective>
- Bertrand, M., Mogstad, M., & Mountjoy, J. (2021), Improving educational pathways to social mobility: evidence from Norway's reform 94. *Journal of Labor Economics*, 39, 965–1010.
- Betts, J. (2011), Chapter 7 – The economics of tracking in education. In E. A. Hanushek, S. Machin and L. Woessmann (eds), *Handbook of the Economics of Education*, Vol. 3, Amsterdam: North-Holland, 341–81.
- Bhalotra, S., Karlsson, M., Nilsson, T., & Schwarz, N. (2022), Infant health, cognitive performance, and earnings: evidence from inception of the welfare state in Sweden. *Review of Economics and Statistics*, 104, 1138–56.
- Björklund, A., & Salvanes, K. G. (2011), Chapter 3 – Education and family background: mechanisms and policies. In E. Hanushek, S. Machin and L. Woessmann (eds), *Handbook of the Economics of Education*, Vol. 3, Amsterdam: North-Holland, 201–47.
- Black, S., & Devereux, P. (2011), Chapter 16 – Recent developments in intergenerational mobility. In O. Ashenfelter and D. Card (eds), *Handbook of the Economics of Education*, Vol. 4B, 1st edn, Amsterdam: North-Holland, 1487–541.
- Black, S. E., Devereux, P. J., & Salvanes, K. G. (2007), From the cradle to the labor market? The effect of birth weight on adult outcomes. *Quarterly Journal of Economics*, 122, 409–39.
- Blundell, R., Green, D. A., & Jin, W. (2022), The UK as a technological follower: higher education expansion and the college wage premium. *Review of Economic Studies*, 89, 142–80.
- Boneva, T., Golin, M., & Rauh, C. (2022), Can perceived returns explain enrollment gaps in postgraduate education? *Labour Economics*, 77, 101998.
- Britton, J., Dearden, L., & Waltmann, B. (2021), The returns to undergraduate degrees by socio-economic group and ethnicity. IFS Report 186, <https://ifs.org.uk/publications/returns-undergraduate-degrees-socio-economic-group-and-ethnicity>.
- Brunello, G., & Checchi, D. (2007), Does school tracking affect equality of opportunity? New international evidence. *Economic Policy*, 22, 781–861.
- Bukodi, E., & Goldthorpe, J. H. (2018), *Social Mobility and Education in Britain: Research, Politics and Policy*. Cambridge University Press.

- Bütikofer, A., Löken, K. V., & Salvanes, K. G. (2019), Infant health care and long-term outcomes. *Review of Economics and Statistics*, 101, 341–54.
- Card, D. (1999), Chapter 30 – The causal effect of education on earnings. In O. Ashenfelter and D. Card (eds), *Handbook of Labor Economics*, Vol. 3, Part A, 1st edn. Amsterdam: North-Holland, 1801–63.
- Card, D., & DiNardo, J. E. (2002), Skill biased technological change and rising wage inequality: some problems and puzzles. *Journal of Labor Economics*, 20, 733–83.
- Carneiro, P., García, I. L., Salvanes, K. G., & Tominey, E. (2021), Intergenerational mobility and the timing of parental income. *Journal of Political Economy*, 129, 757–88.
- Carneiro, P., Liu, K., & Salvanes, K. G. (2022), The supply of skill and endogenous technical change: evidence from a college expansion reform. *Journal of the European Economic Association*, 21, 48–92.
- Carneiro, P., Salvanes, K. G., Willage, B., & Willén, A. (2023), Childhood shocks across ages and human capital formation. HCEO Working Paper No. 2023-018.
- Case, A., & Deaton, A. (2020), *Deaths of Despair and the Future of Capitalism*. Princeton University Press.
- Cattan, S., Salvanes, K. G., & Tomoney, E. (2023), First generation elite: the role of school networks. CEPEO Working Paper No. 23-04.
- Chetty, R., Friedman, J. N., Saez, E., Turner, N., & Yagan, D. (2020), Income segregation and intergenerational mobility across colleges in the United States. *Quarterly Journal of Economics*, 135, 1567–633.
- Crawford, C., Gregg, P., Macmillan, L., Vignoles, A., & Wyness, G. (2016), Higher education, career opportunities, and intergenerational inequality. *Oxford Review of Economic Policy*, 32, 553–75.
- Cunha, F., Heckman, J. J., & Schennach, S. M. (2010), Estimating the technology of cognitive and noncognitive skill formation. *Econometrica*, 78, 883–931.
- Currie, J., & Almond, D. (2011), Chapter 15 – Human capital development before age five. In D. Card and O. Ashenfelter (eds), *Handbook of Labor Economics*, Vol. 4. Amsterdam: North-Holland, 1315–486.
- Domanski, H., & Przybysz, D. (2007), Homogamy in 22 European countries. *European Societies*, 9, 495–526.
- Dustmann, C., Puhani, P. A., & Schönberg, U. (2017), The long term effects of early track choice. *The Economic Journal*, 127, 1348–80.
- Dustmann, C., & Schönberg, U. (2012), What makes firm-based vocational training schemes successful? The role of commitment. *American Economic Journal: Applied Economics*, 4, 36–61.
- Essaji, A., & Neil, C. (2012), Policy forum: delivering government grants to students through the RESP system – distributional implications. *Canadian Tax Journal*, 60, 635–49.
- Foley, K., Gallipoli, G., & Green, D. A. (2014), Ability, parental valuation of education, and the high school dropout decision. *Journal of Human Resources*, 49, 906–44.
- GDIM (2023), Global Database on Intergenerational Mobility. Development Research Group, World Bank. Washington, DC: World Bank Group.
- Halpin, B., & Chan, T. W. (2003), Educational homogamy in Ireland and Britain: trends and patterns. *British Journal of Sociology*, 54, 473–95.
- Hamplova, D., & Le Bordais, C. (2008), Educational homogamy of married and unmarried couples in English and French Canada. *Canadian Journal of Sociology*, 33, 845–72.
- Hanushek, E. A., Schwerdt, G., Woessmann, L., & Zhang, L. (2017), General education, vocational education, and labor-market outcomes over the lifecycle. *Journal of Human Resources*, 52, 48–87.
- Hjort, J., Solvsten, M., & Wust, M. (2017), Universal investment in infants and long-run health: evidence from Denmark's 1937 home visiting program. *American Economic Journal: Applied Economics*, 9, 78–104.
- Katrnak, T., Fucik, P., & Luijckx, R. (2012), The relationship between educational homogamy and educational mobility in 29 European countries. *International Sociology*, 27, 551–73.
- Katz, L. F., & Murphy, K. M. (1992), Changes in relative wages, 1963–1987: supply and demand factors. *Quarterly Journal of Economics*, 107, 35–78.
- Lazear, E. P. (2001), Educational production. *Quarterly Journal of Economics*, 116, 777–803.
- Narayan, A., van der Weide, R., Cojocaru, A., Lakner, C., Redaelli, S., Mahler, D., Ramasubbaiah, R., & Thewissen, S. (2018), *Fair Progress? Economic Mobility Across Generations Around the World*. Washington, DC: World Bank.
- Pekkarinen, T. (2008), Gender differences in educational attainment: evidence on the role of tracking from a Finnish quasi-experiment. *Scandinavian Journal of Economics*, 110, 807–25.
- Pekkarinen, T., Uusitalo, R., & Pekkala Kerr, S. (2009), School tracking and intergenerational income mobility: evidence from the Finnish comprehensive school reform. *Journal of Public Economics*, 93, 965–73.
- Rawls, J. (1999), *A Theory of Justice*. Harvard University Press.
- Satz, D. (2007), Equality, adequacy, and education for citizenship. *Ethics*, 117, 623–48.
- Schwartz, C. R., & Mare, R. D. (2005), Trends in educational assortative marriage from 1940 to 2003. *Demography*, 42, 621–46.
- Sen, A. (2000), Merit and justice. In K. Arrow, S. Bowles and S. Durlauf (eds), *Meritocracy and Economic Inequality*. Princeton, NJ: Princeton University Press, 5–16.
- Silliman, M., & Virtanen, H. (2022), Labor market returns to vocational secondary education. *American Economic Journal: Applied Economics*, 14, 197–224.

- Woessmann, L. (2009), International evidence on school tracking: a review. *CESifo DICE Report* 7 (1), 26–34.
- Zimmerman, S. D. (2019), Elite colleges and upward mobility to top jobs and top incomes. *American Economic Review*, 109 (1), 1–47.

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