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Working paper

# Education and inequality: an international perspective

# Education and Inequality: An International Perspective

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## Abstract

In this paper, we summarize existing literatures 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, the extent of intergenerational correlations in income and access to the levers of educational access, policies that aim at increasing education are not necessarily beneficial (and in some cases appear to be harmful) in the sense of reducing inequality. Differential impacts of different systems by gender are particularly striking.

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# 1 Introduction

At first glance, raising education levels has the appearance of a silver bullet in response to the inequality problems that have plagued developed economies in recent decades. On an individual level, estimates of the causal effect of increased education on earnings point to substantial returns to educational investments. There is also clear evidence of positive health effects and increased political participation, potentially leading to a more resilient democracy (Oreopoulos and Salvanes, 2011). At a general equilibrium level, in a standard neoclassical labour market model, raising the education level of one person in a fixed population means one more person to compete with the more educated workers and one less to compete with the less educated. The implication is a reduction in returns to education brought about, in part, by increasing the wages of the lower educated.

In recent years, however, there has been an increasing recognition that the details of access to higher education can lead to the opposite conclusion: that an expansion of higher education can reinforce social and economic hierarchies and generate new inequalities (Zimmerman (2019), Chetty et al. (2023)). Importantly, the effects of family SES on educational attainment and returns to schooling have been observed not just in the context of elite colleges in the US but also in trades related educational streaming in Germany (Dustmann and Schönberg, 2012).

So, is educational expansion an effective tool for reducing inequality across a wide variety of institutional settings? Alternatively, do some educational systems have better associations with low inequality and others worse? In this paper, we summarize existing literatures and present new empirical evidence in order to address these questions. We will argue that depending on the form the policies take, the extent of intergenerational correlations in income and access to the levers of educational access, policies that aim at increasing education are not necessarily beneficial (and in some cases appear to be harmful) in the sense of reducing inequality.

Our approach to these questions proceeds in a series of steps. We will start by defining 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 like 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 will 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 inter-generational 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 cross-country study carried out adjacent to the Deaton Inequality Project since we were able to work directly with people from each participant country in our attempts to characterize the nature of the education systems in each.

We discuss our empirical results in the context of our initial argument that our policy conclusions should be stated in terms of impacts on the justness of societies. That, of course, immediately raises the question of what notion of justice to use as a benchmark. We argue that a common theme across most theories of justice is an emphasis on providing everyone with the bases of self and social respect. Seen in the light of that goal, education systems can have beneficial impacts by providing the means to increase self-efficacy, but they can also generate what Anne Case and Angus Deaton refer to as ‘unequal meritocracies’ (Case and Deaton (2020)) - hierarchies that deliver not only income but also respect to a only subset of the population.

One place to look for evidence of the extent of those hierarchies is in intergenerational persistence in levels of education, and in the third section of the paper, we summarize the evidence on that persistence. While policymakers suggest strengthening technical and vocational education may “level the playing field” (Augar et al., 2019), there exists limited evidence on how the structure of a country’s education system impacts equality of opportunity. Among the key conclusions from the literature on the intergenerational transmission of education is that the process determining that transmission is complex - determined by parental preferences and resources interacting with educational systems at both the pre-school and formal schooling levels. In the empirical work in this paper, we focus on education systems at the primary and secondary levels (taking as given the evidence from the large literature on early childhood education that policies at that level have important impacts on student outcomes (Attanasio et al., 2021)). At those levels, we point out that an important, understudied element of education systems is the trade-off between systems that have clear streaming, with an emphasis on vocational training for some students (epitomized by Germany), and general academic systems that put little emphasis on vocational training (epitomized by the US). With respect to our goal of providing a basis for respect, a more streamed system could open options for productive, vocational education for students whose comparative advantage is not in abstract thinking and who come from lower educational backgrounds, but it could, alternatively, build more rigid hierarchies. Importantly, the evi-

dence that does exist on the efficacy of these different systems indicates that there could be a substantial gender difference in the efficacy of each.

One other important take-away from our discussion of inter-generational transmission of education is that the majority of primary and secondary students will not go on to a university education. That means that a more just education policy should aim at good outcomes both in terms of income and respect for those who do not. One possible way they can do that, as just mentioned, is through providing practical training that leads to good jobs for the “forgotten half” of non-college youth (Halperin, 1998). Another is through the standard general equilibrium effects described earlier. In the fourth section of the paper, we examine the claim that increasing educational levels is a tide that raises all boats. Putting aside the direct concern that policies that subsidize education in general tend to be better utilized by middle and upper income families, we argue that movements in education levels and earnings differentials do not support the standard model of technological change and the labour market. Instead, they fit with models of endogenous technological change in which increasing the proportion of workers with a university degree can have limited or even adverse effects on inequality, including worsening the earnings outcomes of those who do not attend university.

In the fifth section of the paper, we use OECD descriptions of educational systems that we coded in (and checked with participants from countries involved in the Deaton inequality project) in combination with measures of intergenerational transmission of education we calculated using Programme for the International Assessment of Adult Competencies (PIAAC) data. Based on a factor analysis, we argue that educational systems can be characterized 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 of low education parents who attain a university education.<sup>1</sup> The proportion of the 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 get high scores on streaming (Germany and Austria, for example) – what 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.

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<sup>1</sup>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.

We relate these different education system measures 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 of education literature discussed in section 2. Countries with a high degree of streaming also have higher probabilities of boys low educated families attaining middle education levels and relatively low values of the Gini corresponding to cross-sectional inequality. In contrast, the correlation between the streaming measure and inter-generational earnings mobility is negative for girls is negative. 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 the US and Italy 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 and social respect we argue is 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 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.

Finally, we also examined the relationship of educational systems with rates of deaths of despair, under an hypothesis that systems that engender more mobility are ones that make people feel less trapped by globalization and technological events beyond their control. However, we do not find any strong correlations of our systems measures with deaths of despair rates across countries.

Overall, we believe the evidence we discuss in the 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 subsidization 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 little 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 doesn't 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

John Rawls frames his famous book, *A Theory of Justice*, as an inquiry into the proposition 'Justice is the first virtue of social institutions, as truth is of systems of thought. ... laws and institutions no matter how efficient and well-arranged must be reformed or abolished if they are unjust'((Rawls, 1999), p. 1)

His conclusion, in the end, is that this is the case - 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.' Stating that, '(t)aken together as one scheme, the major institutions define men's rights and duties and influence their life-prospects, 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'((Rawls, 1999), p. 6).

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 will 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. We see a focus on the bases of self-respect as a prime candidate for that commonality. In Rawls' theory, for example, deliberations about just social institutions carried out behind the veil of ignorance are about their impact on the distribution of social primary goods - 'things which it is supposed a rational man wants whatever else he wants' - and self-respect holds a special place among those goods:

'perhaps the most important primary good is that of self-respect. Without it nothing may seem worth doing, or if some things have value for us, we lack the will to strive for them. All desire and activity becomes empty and vain, and we sink into apathy and cynicism. Therefore the parties in the original position would wish to avoid at almost any cost the social conditions that undermine self-respect.'(Rawls (1999), p. 386).

Similarly, Martha Nussbaum places in her list of ten Central Capabilities, 'Having the social bases of self-respect and nonhumiliation; being able to be treated as a dignified being whose worth is equal to that of others'((Nussbaum, 2011),p. 34). Elizabeth Anderson argues for what she calls democratic equality: 'In seeking the construction of a community of equals, democratic equality integrates principles of distribution with the expressive demands of equal respect'((Anderson, 1999), p. 289). We are not in a position to summarize Indigenous theories of distributive justice (if, indeed, such a summary is even possible) but the Canadian Indigenous political theorist Dale Turner emphasizes the centrality of the oral tradition for Indigenous communities and how that necessarily leads to a crucial role for respect, as each party listens and is listened to in their turn. In speaking of the Iroquian Confederacy's Great Law of Peace, Turner talks of it being built around the three concepts of respect, reciprocity and renewal (Turner, 2006). Michael Sandel argues that the grounds of self-respect are defined, in part, in terms of our community based identity (Sandel, 2020). Even Libertarian approaches are rooted in a respect for individual choices and property rights, with the dignity of the person being of central importance.

Importantly, for all of these theorists, respect has a crucial social dimension. In fact, Nussbaum lists self-respect as a sub-heading under the Affiliation Central Capability. Turner,



referring to the Great Law of Peace, says, 'respect functioned in a communal context; that is individual respect was reciprocated'((Turner, 2006), p. 49), and Anderson talks about a 'community of equals'. Rawls argues that self-respect stems from a combination of having a rational plan of life, 'a confidence in ones ability, so far as it is within ones power, to fulfill ones intentions,' and 'finding our person and deeds appreciated and confirmed by others who are likewise esteemed and their association enjoyed'((Rawls, 1999), p. 386).

Based on this, we will focus on the goal of providing access to the bases of the combination of self and social respect for all in our discussions. Of course, respect plays different roles in the different theories so that focusing on it does not provide a perfect solution in our search for a basis for agreement among theories. But we don't necessarily need perfect agreement. Cass Sunstein talks about 'incompletely theorized agreements,' stating that '(p)eople may agree on a mid-level principle but disagree both about the more general theory that accounts for it and about outcomes in particular case'(Sunstein (1997), p.1735). We see providing the bases of self and social respect for all as such an incompletely theorized agreement. Nonetheless, while we view a focus on the bases of self and social respect 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 and social respect to everyone in society necessarily places restrictions on how we allocate access to education. Rawls' 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' 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 recognizes the long training needed to become one. But education, at the same time, has direct implications for both of Rawls' 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 our deeds (are) appreciated and confirmed by others.' Rawls speaks directly to both of these implications when discussing the bases of self-respect:

'It follows that the confident sense of their own worth should be sought for the least favoured and this limits the forms of hierarchy and the degrees of inequality that justice permits. Thus, for example, resources for education are not to be allocated solely or necessarily mainly according to their return as estimated in productive trained abilities, but also

according to their worth in enriching the personal and social life of citizens, including here the less favoured'(Rawls, 1999).

For Rawls, concern about self and social respect leads to a conclusion that meritocracies are fundamentally unjust. In the context of his theory, differences in abilities are not seen as individual attributes that bring a claim on extra earnings or respect but as a societal resource to be used for the good of all. A meritocracy gives advantages to people based on an attribute - the ability they are born with - over which they have no moral claim. It violates what Rawls calls his "principle of redress" - that 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.

A similar point motivates part of Satz's discussion of how to create an education policy based on adequacy of access that reflects the goal of democratic equality (Satz, 2007). It is interesting to think of that argument in relation to the evidence from James Heckman, Janet Currie, and others, that early childhood investments yield substantial returns in part because of the complementarity of early life investments with human capital investments later in life (Cunha et al., 2010; Currie, 2001; Attanasio et al., 2021). While that work focuses attention on the benefits of early childhood investments, its implications for investments later in life may be complicated by concerns for self and social respect. In particular, the complementarities between early and later investments imply that the highest returns in terms of economic outcomes to youth and adult investments in education and training would be obtained from investing in those who got a good start in life. If, though, we include a concern for the impact of later life investments on perceptions of self-efficacy (which might even have the opposite complementarity with early life investments in supportive household learning environments), those conclusions may be adjusted. Opportunities for adult training could have important impacts on the ability of individuals to develop a sense of self-efficacy and to break free of hierarchies. From the perspective of Capability theories of justice, similarly, the very fact that people could choose different paths even later in life is a key element of a just society. Thus, in this policy area, as in many others, the efficiency and justice enhancing effects of policies cannot be untangled, and it would be helpful for economists (as the ones who often emphasize issues such as complementarities among different types of human capital) to engage directly in discussions that include both elements.

Rawls' 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).<sup>2</sup>). But Sen points out 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).

At the moment, of course, there is reason to believe that the problems with meritocracy are more than just potential - at least in some countries. Michael Sandel, in this book, *The Tyranny of Merit*, argues that the US has failed in all the areas that Sen lists. As a result, the pursuit of increased education as a societal goal has established an hierarchical system that not only leads to unequal distributions of income but, far more importantly, damages the self-esteem of the people who do not acquire higher education. They are viewed (and made to feel) as failures who did not respond to the opportunity for self-advancement provided by higher education and who, as a result, do not deserve the support or respect of those who did (Sandel, 2020). As Case and Deaton demonstrate, the result of that shows up in catastrophic numbers on deaths of despair 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? Such systems might open more channels to economic success and, with that, promote a wider definition of who deserves respect. Of course, even meritocracies that are built on equal opportunity of educational access could engender disrespect for those who don't get education, so finding that some systems are associated with lower inter-generational persistence wouldn't necessarily be good news. But systems that promote persistence would seem to signal a particularly deep problem. In either case, we would want to go beyond persistence in education and income to ask whether different educational

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<sup>2</sup>Indeed, the practice of rewarding good (or right) deeds for their incentive effects cannot but be an integral part of any well-functioning society. No matter what we think of the demands of 'meritocracy' as it is usually defined, we can scarcely dispense with incentive systems altogether. The art of developing an incentive system lies in delineating the content of merit in such a way that it helps to generate valued consequences'(Sen, 2000), p.9

systems have differential impacts on the distribution of social respect that we view as at the heart of a just society. We take a preliminary stab at that question with data on marriage rates across education groups and on deaths of despair.

### **3 Intergenerational Persistence in Educational Attainment**

Across many fields, there is a long tradition of viewing intergenerational mobility in education, relating the educational attainment from parents to children, as an indicator of a society's equality of opportunity. 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 socioeconomic groups and across countries (Black and Devereux, 2011; Bjørklund and Salvanes, 2011). For instance, the elasticities of relative mobility of education differ substantially across countries, and are dependent on the degree of economic development of the education system and other factors (Narayan et al., 2018; Hertz et al., 2008).

#### **3.1 Family Investments in Education**

The canonical model of intergenerational transmission by Becker and Tomes (1986) lays out the main framework for the role of education in intergenerational persistence. The idea is that parents are interested both in their own current consumption and their offspring's human capital by investing in their schooling. Parents may also borrow or save in the form of debts or bequests for their children. In this framework, parents' human capital and children's ability both increase the productivity of going to school. Given these assumptions, parents' education has a direct effect on their children's productivity of education investment, and thus on how much children invest in human capital, leading potentially to a socio-economic gradient in educational investment. Allowing for budget constraints, parents have to trade off their own consumption against investment in their children's consumption (Becker and Tomes, 1986). In this case, the wealth-constrained families - which are correlated with the low-education parents - may under-invest in their children's education. This implies that bright children from a poor, low-education background will invest too little in schooling. Families that are not wealth constrained will not under-invest. This, therefore, is another

channel for an observed intergenerational persistence in education, driven by the persistence among the low-education and low-income group.

In addition to the life-time resources of parents, the timing of parental investments in children’s education has also been shown to be a key determinant of the children’s future success (Carneiro et al., 2021). Indeed, central to the developing literature on parents’ actions and childhood development is identifying sensitive periods for learning skills, as well as complementarity in skill formation. A body of research shows that skills differ in malleability at different stages of the life cycle, with the pre-school years identified as particularly important for adult success in education and for intergenerational mobility (Black et al., 2007; Currie and Almond, 2011). (Cunha et al., 2010) and (Carneiro et al., 2021) identify sensitive periods in skill formation and find evidence corresponding to dynamic complementarity by analyzing how parental income shocks at different times in childrens lives from birth to adolescence affect the production of human capital in children.<sup>3</sup>.

### 3.2 Education Policies and Intergenerational Mobility

Education policies also have the potential to play an important role in improving intergenerational mobility. For instance, improving the parents’ education levels through education reforms will have a spill-over effect on their children’s education levels. (Macmillan and Tominey (2023)) Importantly, education policies in a wide sense that includes early health and pre-school programs comprise several aspects: resources spent to improve quality, universal programs versus privately funded day care and child health programs, aiming at equal access to education from mandatory schooling to higher education as affected by policies such as on whether to charge fees for higher education, the generosity of access to loans and stipends for higher education, and, notably, policies regarding streaming. The effects of these various 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 socioeconomic classes. An example of successful programs are the infant care programs which all were established in Sweden, Denmark and Norway from the 1930s onward. The programs were initiated in the very beginning of the Nordic Welfare States and formed the bases for the full scale programs rolled out across the countries in the 1950s and 1960s (Bütikofer et al., 2019; Bhalotra et al., 2022; Hjort et al., 2017).

In the remaining sections of the paper, we examine issues related to education policy in

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<sup>3</sup>Although the literature supports high returns to pre-school investments, it also strongly supports high returns in teen age years (Carneiro et al., 2023). Teenage years constitute a period of development of higher order reasoning as well as important junctures for schooling

more detail. We will frame that discussion in relation to a key set of conclusions that emerge from the intergenerational transmission literature. First, although college attendance has been increasing over the last decades across all OECD countries, still only about 40 percent of birth cohorts eventually attend some level of higher education - with some countries like Italy and Greece much lower, and countries like Canada quite a bit higher. This means that most young people enter the labour force with either only an academic high school degree or only middle school. In the long run, this group may be better off with a vocational degree in terms of reducing dropping-out from high school, reducing youth unemployment, and increasing life-time earnings as compared to their having no degree or only an academic high school diploma.(Silliman and Virtanen (2022a)) A high share of this group are boys, who have been observed to struggle more to acquire a university degree. Moreover, this group of non-college students, as we will show, are dominated by young people from a low SES background, which is at the core of our interest here.

A second main conclusion from the literature is that the efficacy of education policies depends crucially on how they interact with family preferences, investments, and family budget constraints. In the recent literature, information differences have emerged as a key explanation for which early childhood policies work and also for which education policies are more efficient in reducing persistence across generations. In particular, there appear to be differences in expectations of returns to higher education by SES group, with low education parents underestimating the returns to education (Boneva et al., 2021). Another potential mechanism is a socioeconomic gap in aspirations about higher education (Genicot and Ray, 2017). In the Canadian context, Foley et al. (2014) find that parental attitudes toward education are a key determinant of the propensity of boys to drop out of high school, with parental education having little effect on dropping out once they control for measures of cognitive ability and parental educational attitudes. Related to this is the long standing hypothesis from the sociological literature that the returns to higher education, especially stemming from attending elite universities, provide lower returns to candidates from low SES backgrounds (Bukodi and Goldthorpe (2018), Crawford et al. (2016)).<sup>4</sup>

These patterns have important implications for education policy. In particular, in a

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<sup>4</sup>Indeed, recent studies in economics for elite education such as(?) and (Chetty et al., 2020) for the US and to some extent in the UK (Britton et al., 2021), do find large differences in returns to elite universities for high and low SES candidates with the exact same education. However, a recent study for Norway by Cattan et al. (2023) finds that low and high SES candidates who attended elite institutions have no salary differences in the labor market. Importantly, they do find that the social network is important in explaining enrolment in higher education, and in particular, in elite higher education in Norway, and the positive effects are more important for students who themselves have elite parents. These are potentially important factors that have to be explored in future research on understanding the persistent socioeconomic gap in higher educational attainment.

context in which parental attitudes, information, and budget constraints generate a socioeconomic gradient in higher education, policies that subsidize higher education in general may mostly be used by middle and higher education families. The result could be increases rather than decreases in inter-generational 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 low income family children even if the family were unable to make a contribution, RESP’s were mainly used by middle and upper income families. Only 15% 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 emphasize a broader academic education without an attempt to steer students into particular channels. Streaming may have a positive or negative effect on intergenerational mobility depending on which mechanisms are at work. The goal of assigning students to different types of schools or classes within the school by ability may increase educational efficiency by creating more homogeneous groups of students that are easier to teach, and it may help both the weakest and the strongest students (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. Thus, the benefits of tracking depend on whether the peer-effects are linear or not, i.e. whether bad students hamper learning more than good students improve it. 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.<sup>5</sup> Moreover, at least some of the literature finds that the earlier streaming takes place the more important family background becomes with students from low socioeconomic backgrounds performing better and students from high socioeconomic backgrounds performing at similar levels if the tracking age is delayed (Woessmann, 2009). Dustmann and Schönberg (2012) finds a strong connec-

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<sup>5</sup>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 the children, i.e., without an intergenerational focus. Hanushek et al. (2017), using international comparison, finds that vocational education has beneficial earnings effects in the short run but that academic education is better in the longer run since it makes students more adaptable. But Silliman and Virtanen (2022b) use a regression discontinuity design in a Finish context to show that vocational education is better in terms of lifetime earnings for workers who are at the margin of choosing between the two streams. Both can be true at the same time, of course. Bertrand et al. (2021), using a Norwegian policy change, show that a policy that offers vocational training but makes it easy to switch to the academic track is beneficial.

tion between parental background and the choice of children's secondary track in Germany, which substantively affects subsequent educational achievements and contributed to the low intergenerational mobility in education in Germany. Notably, tracking started at the age of 10 in the German states analysed.

As Betts 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. (Betts (2011)) 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 that he attributes 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 et al. (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 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 nor 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 and the strong socio-economic gradient in educational completion, a pre-requisite for education policy to reduce inequality is that it somehow benefits even people from lower

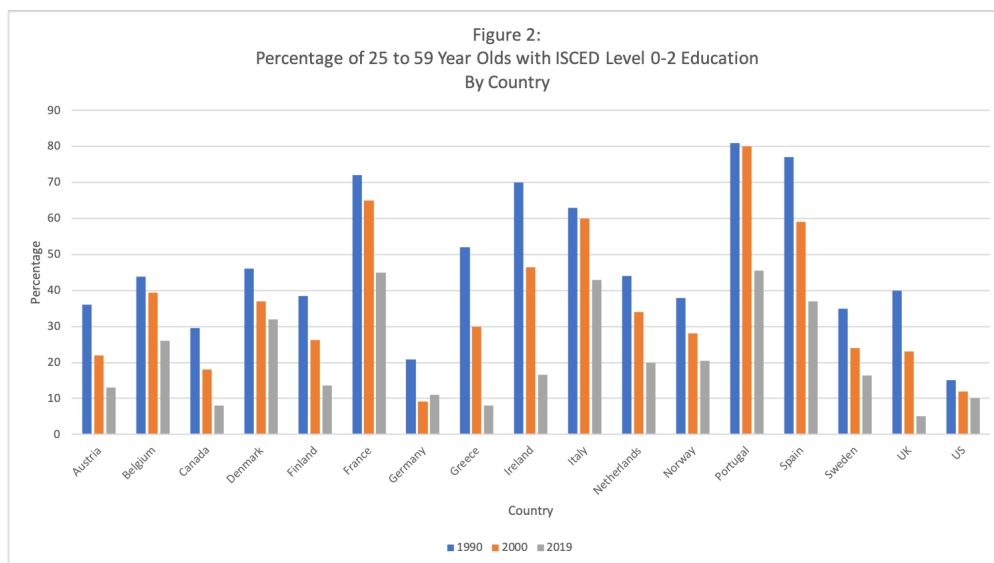
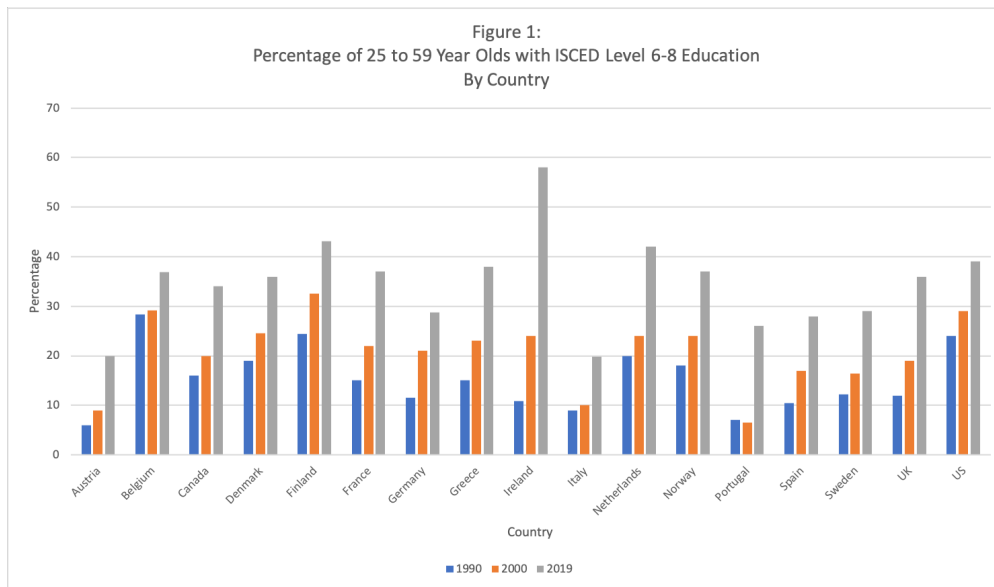


socio-economic backgrounds who do get a university degree. That is, following the Rawlsian rule, education systems need to generate outcomes that are to the good of all. One way that education policy could have this effect is found in standard neoclassical theory in the context of skill biased technological change that has often been argued to have been a key driver of inequality in recent decades. If increased education for some reduces competition in lower educated labour markets, raising the income for others, then education policy distributes the benefits of that technological change more broadly. In the realm of self 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.

The extent to which an exogenously generated technological change, as represented in standard models, has generated patterns of increased inequality in developed economies in recent decades has been the focus of an extended debate. The starting point of that debate is found in a seminal article by Lawrence Katz and Kevin Murphy that argues that one can understand the slowdown in the returns to education in the 1970s followed by its acceleration in the 1980s in the US as the outcome of a skill biased technical change that sprang from the computerization of the economy (Katz and Murphy, 1992). What they pointed out was that the returns to education increased in the 1980s even in the face of increasing education attainment, implying that there must have been a relative demand shift favouring the more educated that outstripped the supply effects. In subsequent decades, as US wage and income inequality continued to rise, the explanations for the rise extended to include the decline in labour market ‘institutions’ like the minimum wage and unionisation (Cengiz et al., 2019; Fortin et al., 2021), a more general decline in the ability of workers to capture economic rents, and the impacts of trade, particularly on the low educated (Autor et al., 2013).

An increase in education levels could be seen as a direct response to increases in inequality stemming from trade and technology shocks: moving workers out of the line of fire of the trade shock and toward the benefits of demand for skills stemming from new technologies. It might even be seen as a response to the decline in institutions, moving workers out of the part of the income distribution where they need help from regulations and unionisation, and the decline in worker rent share, to the extent that more educated workers have a wider set of outside options and, so, greater bargaining power. But patterns of responses in educational wage differentials to increases in education levels give reason for pause in rushing to the conclusion that (even in the absence of the questions about generating meritocracies we discussed in the previous section) more education is necessarily an inequality reducing policy.

It is worth noting that many developed countries have gone through a substantial educational upgrading in the last 30 years. In Figure 1, we plot the proportion of adults aged 25 to 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 Deaton Inequality Project. University education attainment increased dramatically across all 17 countries, averaging at a 39% increase from 1990 to 2000 and 83% over the ensuing two decades. In many of the economies, the post 2000 era, in particular, was an era of rapid educational change. Figure 2 shows that the increase in university education was matched with substantial declines in the percentage with ISCED level 0 - 2 education (roughly equivalent to high school drop outs).



How did these educational increases relate to changes in the educational wage differential? Blundell et al. (2022) examine this question for the UK where only 13 percent of UK working age adults had a university degree in 1990 (half the same percentage in the US at the time). A substantial educational reform in the 1990s led to a surge in university attendance such that by 2010 the UK matched the US, with over 30 percent of adult workers with a university degree. Yet from 1995 through 2010, the ratio of the hourly wage of university degree holders to ‘high school graduates’ did not change.<sup>6</sup> 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.<sup>7</sup> Of those 11 countries: 7 experienced no statistically significant (or economically substantial) change in the wage differential between tertiary and upper secondary educated workers between 2000 and 2010; 2 experienced a statistically significant decline in the differential; and 2 experienced a statistically significant increase. Similarly, Crivallero (2016) finds little response of the wage differential for 12 European economies and Chen (2013) finds no change in the wage differential in Taiwan in response to a large increase in the proportion of workers with a university degree between 1990 and 2010. And it is worth recalling that substantial increases in college attainment in the US in the 1980s were matched with 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.

A pattern of increased education with little change in the university wage differential would be rationalized in a standard model as revealing a relative supply increase being exactly offset by a skill biased demand increase, often attributed to technological change. But for this to be generated by an exogenous technological change would require that change to just happen to be the right size in multiple economies experiencing educational increases of different sizes. Moreover, the movements of the wage levels for upper secondary and tertiary educated workers don’t fit with this claim. Blundell et al. (2022) show that underlying the lack of movement in the university wage differential is a lack of movement in the median wages for both the upper secondary and tertiary educated workers. In the US case in the 1980s,

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<sup>6</sup>High school graduates are defined as people who received a grade of least C in the General Certificate of Secondary Education (GCSE), which are exams that students take at age 16 after 11 years of formal schooling.

<sup>7</sup>The 11 countries are Australia, Belgium, France, Ireland, New Zealand, Norway, Poland, South Korea, Spain, Sweden, and Switzerland. Between 1997 and 2011, the lowest percentage increase the proportion university in this group was for Belgium (with an increase from 25% of its population having a tertiary education in 1997 to 35% in 2010), and the highest was Poland (experiencing an increase from 10% in 1997 to 23% in 2010).

the increase in the education wage differential was generated by a combination of relative 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 demand shift favouring university educated workers 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.

A potential explanation for these patterns is found in models of endogenous technological change. These models come in two broad forms. The first is models of endogenous technological innovation, in which increases in education provide an incentive for inventors to innovate in the direction of technologies that are complementary with high educated workers (Acemoglu, 1998). The second is models of endogenous technological adoption, in which firms choose among existing technological options based on relative factor supplies, shifting toward technologies that make greater use of high skilled workers as more of them become available (Beaudry and Green, 2003). Blundell et al. (2022) argue that the US, as a technological leader, may fit more with the first of these forms while the UK (and other developed economies) fit with the latter. Importantly, 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 et al., 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.

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 toward 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 the conditions for the development of an unequal

meritocracy hold - the capturing of access to education by higher income and education families and a tendency to equate success stemming from education with the right to greater respect. If that is the case, then education policy could become part of an endogenous cycle that reinforces an unequal meritocracy.<sup>8</sup> 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 part of our report, 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 (trades training, for example) is associated with lower persistence in income than, say, a system that focuses its attention on university education. We are motivated in this by observations by Case and Deaton about changes in the US economy, in particular, that have reduced hope for people who are less likely to go to university (Case and Deaton, 2020). An educational system that provides more middle-skill options may reduce feelings that getting education requires jumping over a chasm and leaving behind the people and culture you know. 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

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<sup>8</sup>Satz (2007) discusses a related but separate sense in which the form of educational spending can have endogenous impacts on how merit is defined and who reaches the front of the queue when people's merit is ranked.

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.

## 5.1 Characterizing Educational Systems

The first step in our investigation is to establish a set of measures for characterizing key features of the educational systems in different countries. We approached this task in two stages. The first was to generate a set of measures such as the age at which compulsory schooling starts using education system 'maps' created by the OECD. The second was to share the maps and our coding based on them with team members from other countries in our international inequality group. We obtained feedback from them on where the maps and/or the coding were not accurate descriptions of the education system in their country and adjusted our coding accordingly.

### 5.1.1 OECD Country Education Maps

As part of their *Education at a Glance* publications in the 1990s, the OECD collected annual data on educational attainment in OECD countries. Those reports also included maps of the educational systems, showing 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.<sup>9</sup> 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. We also coded in the 2020 maps, which were the most recent available.

Figure 3 contains the 2020 map for Canada, with figure 4 providing definitions of the symbols used in the map. Working with these maps, we coded a set of variables as follows:<sup>10</sup>

- Age Starting Pre-primary: the age at which a child first enters the educational system. For the Canadian map, this corresponds to the 3 to 5 year old range at the bottom of the map and represents entry into pre-school systems that are not compulsory.

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<sup>9</sup>This can be accessed at [gpseducation.oecd.org](https://gpseducation.oecd.org)

<sup>10</sup>For countries with multiple systems, we used the system in the largest sub-region as measured by population.

- Age at Which Primary School Starts: often (but not always) the same as the age at which compulsory schooling starts (age 6 for Canada).
- Age Compulsory School Ends: denoted by the heavy triangle (either age 16 or 18 depending on the province in Canada).
- Years in Primary: length of primary schooling (6 in Canada)
- # 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. This is 1 in Canada where there is no secondary level vocational system with the exception of in the province of Quebec.
- Age of First Exit Point: age at which the first recognized allowable exit occurs, i.e., the first age at which a student could leave schooling with some form or credential or diploma. In the Canadian example, this is the same as the end of compulsory schooling in provinces where the end of compulsory schooling is age 18. The end of compulsory schooling comes before the first exit point in provinces where compulsory schooling ends at age 16.
- # of Streams at ISCED Level 3: the number of streams when a student is in ISCED level 3. Since compulsory school ending is often in ISCED 3, this often (but not always) takes the same value as # of Streams at Compulsory School End.
- Age When System First Streams: This variable captures how early in a system streaming occurs.

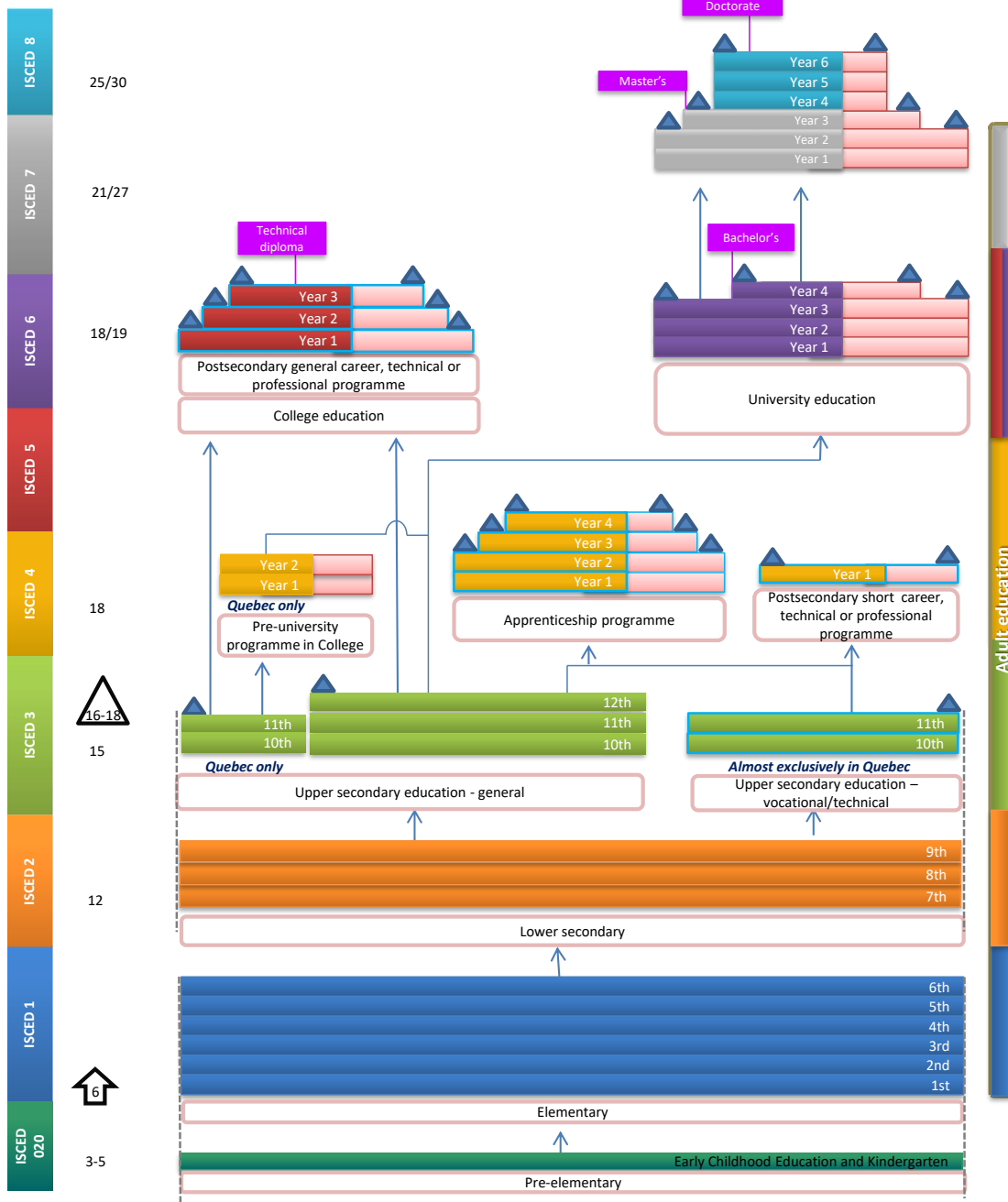
The list of variables combines standard measures of school systems with measures that reflect our interest in the extent to which different systems have varied options for students as well as insights from the literature (e.g., that age at which streaming starts can matter (Woessmann, 2009) and Dustmann and Schönberg (2012)). Some of these measures are quite straightforward (the ages that compulsory schooling start and end are typically written in law or regulation) while others may include some interpretation. It is for that reason that we received input from specialists in the study member countries to make sure the measures reflect the actual educational systems. We were able to construct these measures for 23 countries in 1993 and 36 countries in 2020.

In figure 3, we plot histograms of the streaming related measures for the countries in the 1993 maps. The plot for Age Where System First Streams shows a split into three types

Theoretical starting age\*

Canada

2020









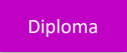


© EducationGPS

Figure 1: OECD Education Map for Canada



# Key

	Starting/ending age of compulsory education
	Recognized exit point of the education system
	Typical student flow
	Transfer from a programme to another
	Programme designed for part-time attendance
	Vocational/Professional orientation (according to national definition at the tertiary level)
	Single structure education (integrated ISCED levels)
	May be provided within one school structure
	Transfer at crossing lines is not possible
	Name of diploma, degree or certificate
2020	Reference year (school year 2019/2020 in the northern hemisphere)

\* **Theoretical starting ages** refer to the ages as established by law and regulation for the entry to a programme, actual starting ages may vary depending on the programme.

Figure 2: OECD Map Symbol Definitions

of systems: one that puts students into streams quite early (by ages 10 to 12); another—the largest group—where streaming starts happening during secondary school; and a third group where streaming doesn’t happen until after secondary school (consisting of the US and Canada). The number of streams at the age when compulsory school ends varies widely, with 6 systems not beginning streaming until after the end of compulsory schooling and the rest having students in from 2 to 5 streams by that point. The age when a student can first legally leave schooling varies considerably from a low of 14 to a high of 19 years of age but with concentrations at ages 16 and 18.

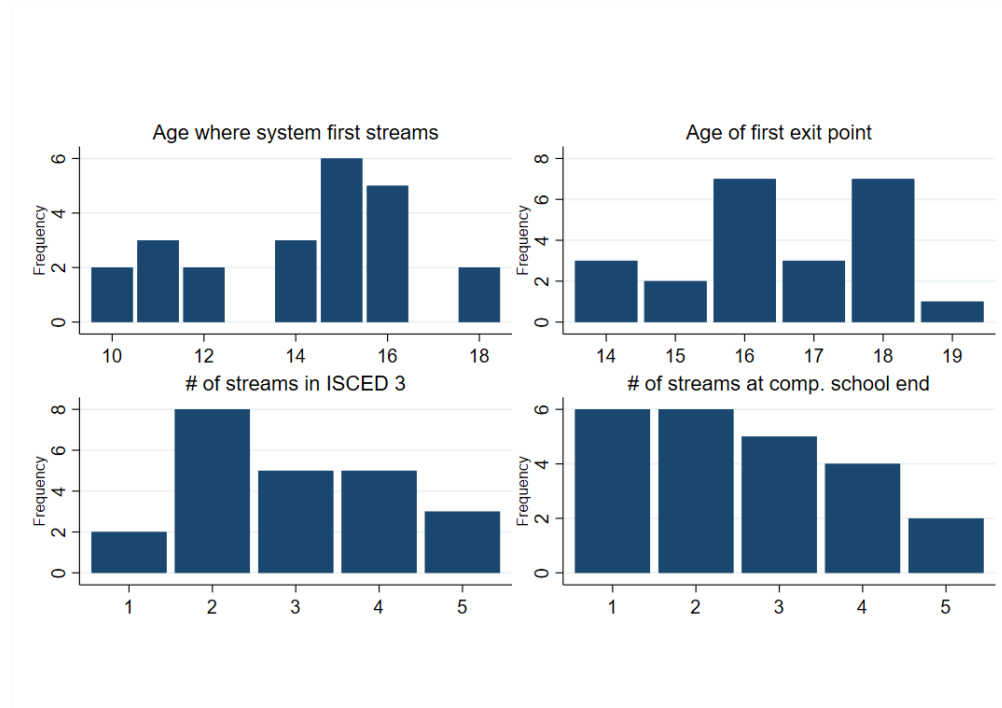


Figure 3: Country Distribution of Streaming and Age of First Exit Characteristics (1993)

Figure 4 presents similar histograms for key ages and years in primary schooling for the 1993 OECD education map countries. Here, the variation across countries is somewhat less, though still notable. The number of years a student spends in primary school, for example, varies from 4 to 7 and the age at which schooling systems first start teaching young children (i.e., the age at which education becomes universally available and part of the formal education system) varies from 0 (which occurs for Sweden and its ‘infant education’ early childhood system) to age 4. Given that the literature on the impacts of early childhood education point to the importance of the quality and targeting of interventions, our simple measure of when pre-school starts could reasonably be seen as a weak representative of true differences across systems.

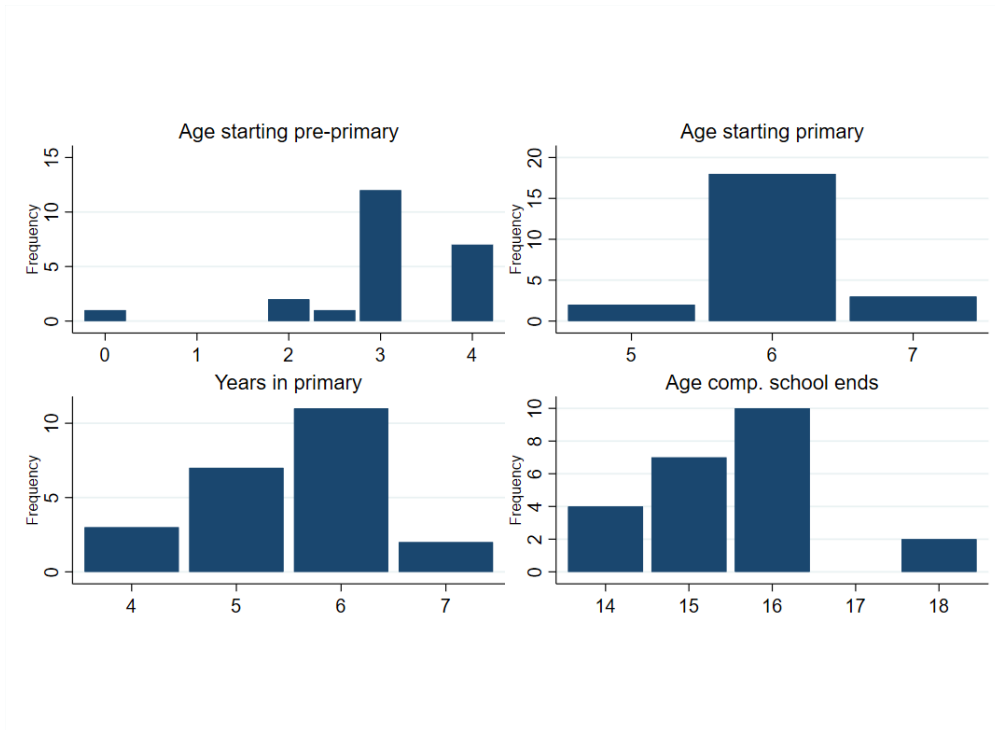


Figure 4: Country Distribution of Compulsory, Pre-Primary and Primary Schooling Characteristics (1993)

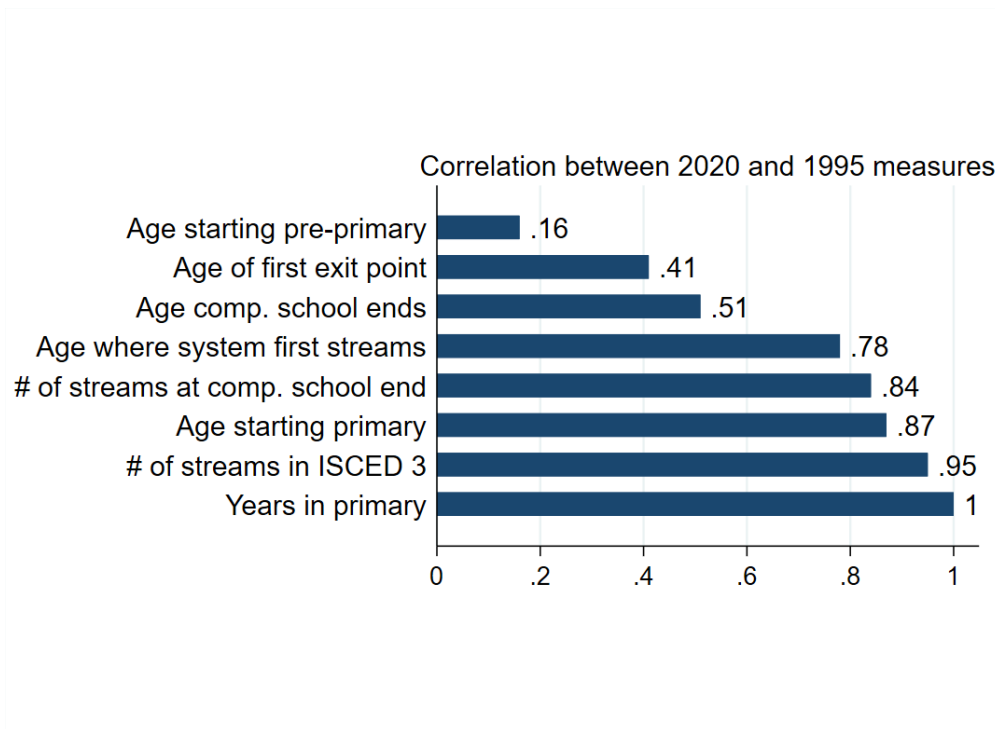


Figure 5: Reform and System Persistence: 1993 to 2020

With characterisations of educational systems in 1993 and 2020, we can ask whether there were substantial reforms (that might be used to identify causal effects) in the intervening years. In figure 5, we plot correlations of characteristic values within countries between the two dates. The streaming, age at which primary school starts, and number of years in primary school features were largely unchanged between 1993 and 2020. These appear to be fundamental and stable components of educational systems. On the other hand, the age at which pre-primary started and the age at which compulsory school ended both show much lower correlations, reflecting general tendencies to lower the former and raise the latter.

The persistence in streaming characteristics combined with the bunching of sets of countries by the age when a system first streams raises the possibility that there are a few overarching types of systems. To examine this further, we carried out a principle components analysis (PCA) of our set of system characteristics. In a PCA analysis, a first component is chosen as the linear combination of the underlying variables that explains 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% of total variation. To represent what that first component captures, in figure 6 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 since streaming happens mainly in secondary school.<sup>11</sup> We will refer to the first factor as the ‘streaming factor’. As we will see in figures below, there are clear groupings of countries with high values for the streaming factor (Germany, Austria and Belgium) and very low values (Canada, the US, and possibly Finland). The remainder of 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 examining whether the different system types are associated with differences in intergenerational mobility.

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<sup>11</sup>The second component accounts for 27% of total variation. Its associations are scattered in a way that makes it difficult to interpret and we won’t use it in the discussions in the paper.

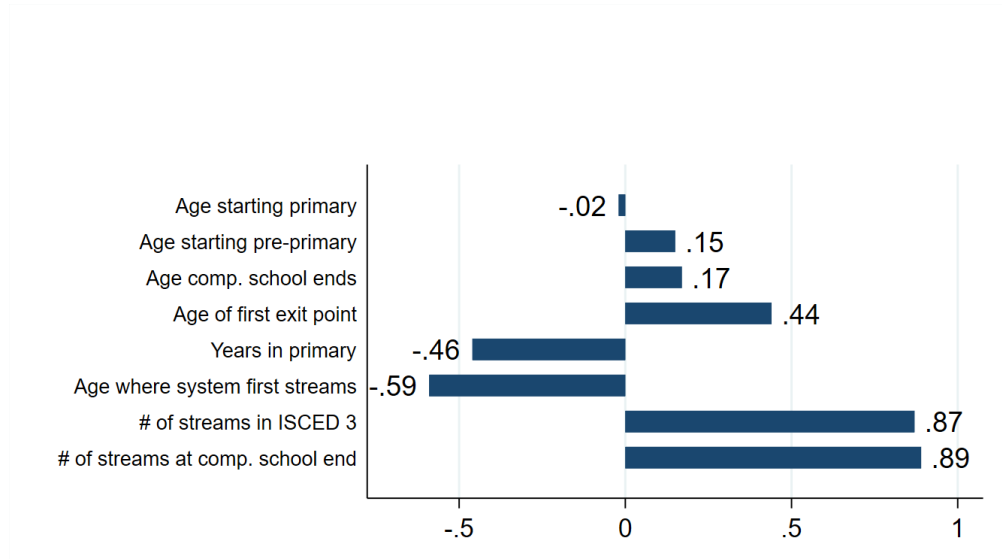


Figure 6: First Component Correlations with Underlying Variables

## 6 Intergenerational Mobility and School Systems

### 6.1 PIACC Data

At the centre of our investigations of intergenerational educational and income mobility is a survey conducted in over 40 OECD countries under the Programme for the International Assessment of Adult Competencies (PIAAC). The survey was conducted in 2011/12 in the various economies and consisted of 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. That makes it possible to construct measures of intergenerational educational mobility in a consistent way across countries. The survey allows us to construct those measures separately by the gender of children and parents. As we will see, there are substantial differences in patterns for sons versus daughters. We focus on countries involved in the IFS/Deaton international inequality study in order to link better with other parts of the study and to keep the focus on developed economies. There are approximately 5000 observations (aged 16 to 65) in each country's survey.<sup>12</sup> Among those, we select adults age 30 to 39 as the

<sup>12</sup>Specifically, we work with the surveys for Italy, Spain, Greece, Ireland, Finland, the UK, US, Canada, the Netherlands, France, Germany, Sweden, Norway, Belgium (Flanders) and Denmark. The Greek survey

‘children’s’ generation, implying they 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, in rough terms, were born in the 1940’s and early 1950’s. Parental education is recorded in three levels in the PIACC: Low (Primary or lower secondary education (ISCED 0-2)); Middle (Upper secondary education or post-secondary non tertiary (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.

In figure 7, we plot the proportions of fathers (left panel) and sons (right panel) in each of the three education levels in each country, with the countries ranked from left to right by the proportion of fathers in the low education category. The first noteworthy point from this figure is the substantial variability in education levels across countries in the fathers’ generation, with the percentage with Low education ranging from over 70% in Italy and Spain to 15% in Germany. As we move to the right in the fathers’ figure, and the proportion with a Low education falls, what rises most strongly is the proportion with a Middle education level. By the time we reach the sons’ generation in 2011/12, the proportion with a Low education has fallen substantially relative to the fathers’s generation in all countries, though the ordering of the countries in this dimension remains roughly the same and the percentage with a Low education in Italy and Spain is still relatively high at around 40%. Whether the fall in Low education is mainly offset by increases at the Mid or High levels varies across countries with one set of countries having Mid education as their largest category (Germany, Sweden, and the US), others having High education as the dominant category (Canada and the UK), and the rest with a balance of the two.

We capture the extent of intergenerational mobility that underlies the patterns in figure 7 using a measure of absolute mobility that equals the proportion of sons with a higher level of education than their fathers (see (Narayan et al., 2018) for a discussion of definitions and assumptions related to mobility measures). We plot this measure in figure 8, with the countries again ranked by the proportion of fathers with Low education. The absolute mobility measure is imperfect since 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 fathers with Low education have some of the lowest absolute

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was conducted in 2014-15. Portugal is not in the public use version of the PIACC and the Austrian data does not include the gender of the child and so we don’t include either of them.

mobility rates. Germany is also interesting for a similar reason: it 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 like Canada that had a relatively high proportion of fathers in the High category.

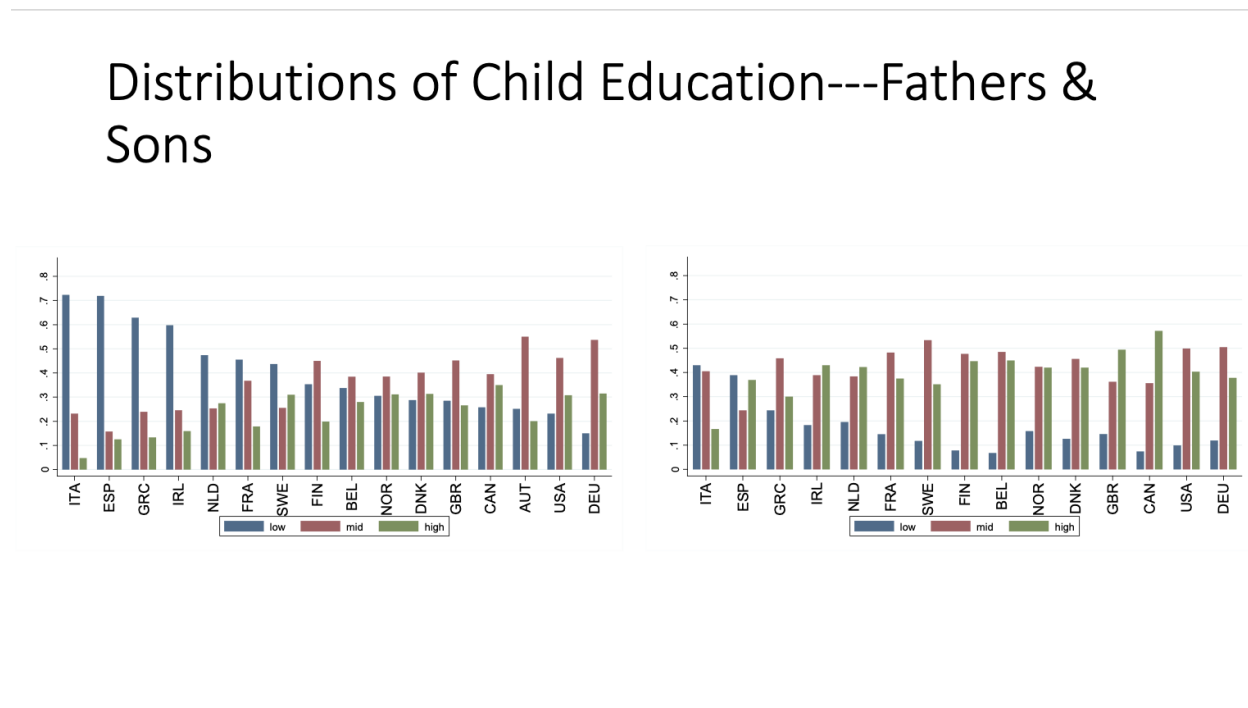


Figure 7: Educational Distribution, Fathers (Left), Sons(Right), PIACC

In figures 9 and 10, we reproduce the generational education plots for mothers and daughters (though we continue to order countries by the fathers' Low education proportion to make reading across figures easier). Mothers have a similarly high degree of variation in the proportion with Low education across countries, with Italy and Spain again standing out for very high levels. In general, mothers' education levels are below those of fathers across the set of countries. Comparing the right panel of figure 9 to the right panel of figure 7, one can see that the well known result that women have moved more strongly into university education than men in recent generations is true across countries. For most countries, the proportion of daughters with a High level of education outstrips the proportion with a Middle level, and often by quite a substantial margin. Figure 10 shows that these patterns show up in higher absolute mobility for daughters than sons in almost every country. The key exception is Germany, where upward mobility is actually slightly lower than for sons.

In figure 11, we plot son's education levels grouped by their father's education levels for Italy and Germany in order to show the mobility patterns underlying the absolute mobility

## Absolute Mobility in Education --- Father's Education & Sons

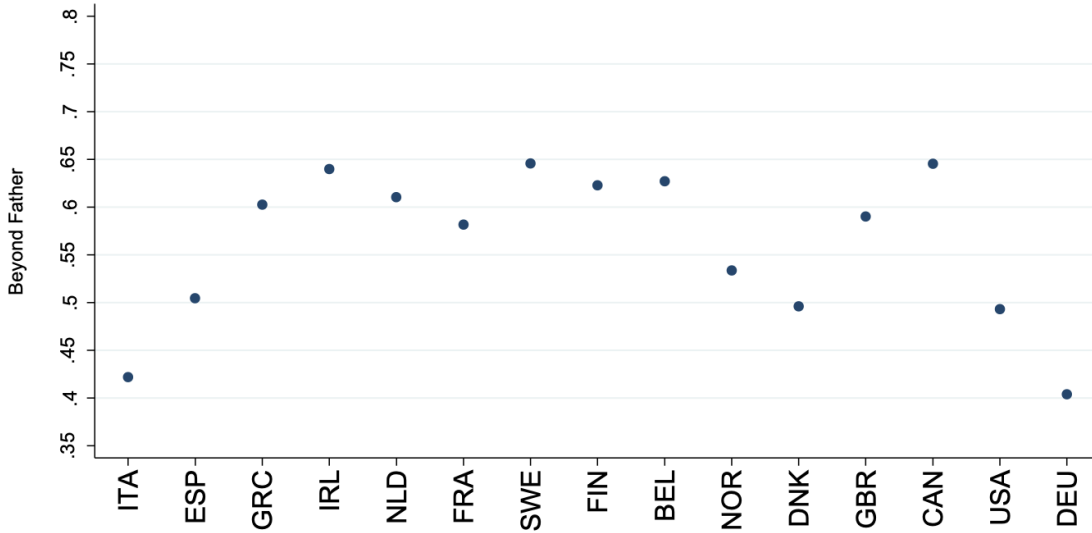


Figure 8: Absolute Educational Mobility: Proportion of Sons with Higher Education than their Fathers, PIACC

## Distributions of Child Education---Mothers & Daughters

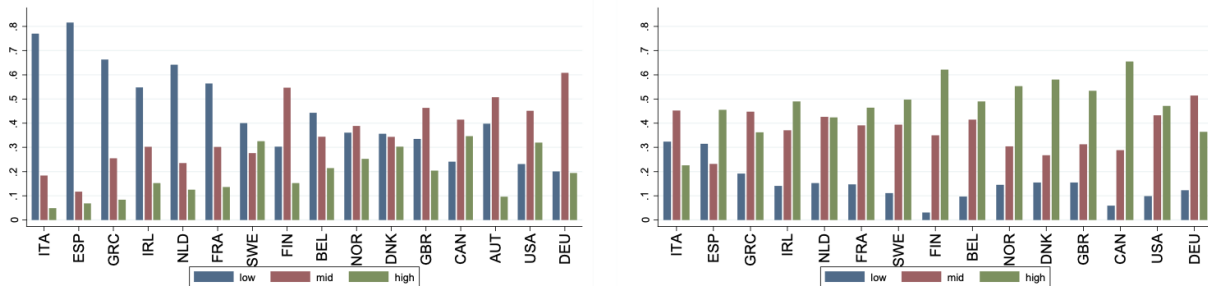


Figure 9: Educational Distribution, Mothers (Left), Daughters(Right), PIACC



## Absolute Mobility in Education --- Mother's Education & Daughters

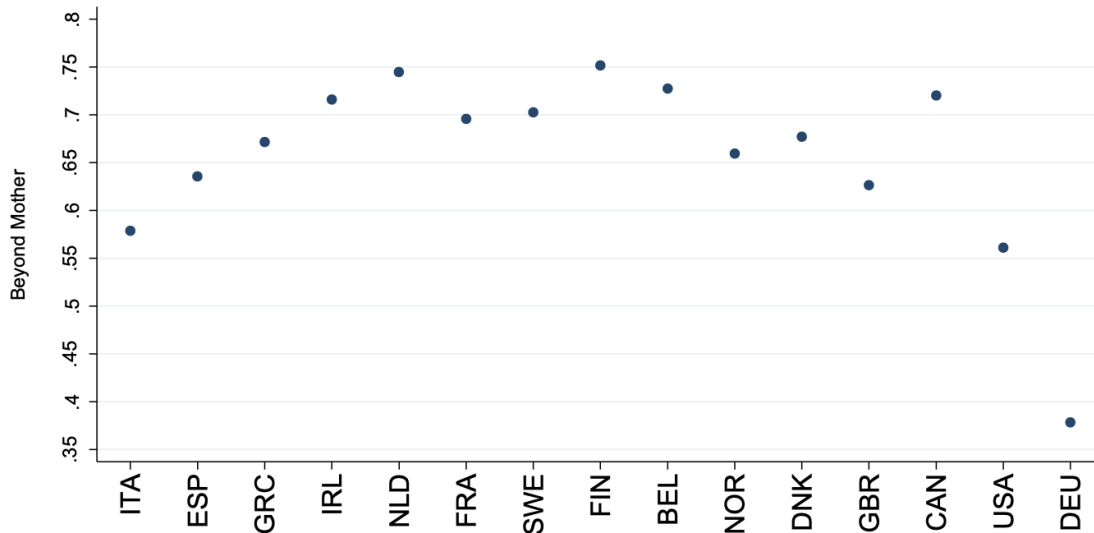


Figure 10: Absolute Educational Mobility: Proportion of Daughters with Higher Education than their Mothers, PIACC

measure for the two countries with the lowest values of that measure. Italy has the highest probability that a son born to a Low educated father is also Low educated of any of the countries in our sample. At the other end, its probability of High educated fathers having High educated sons is in the top half of our countries for that measure. The educational distribution of the sons of Middle educated fathers is more mixed but still shows persistence in that category. Overall, the Italian system seems to be very inter-generationally rigid at all levels. In comparison, Germany gets its low absolute mobility score from a combination of quite high proportions of the sons of Middle educated fathers being Middle educated and reasonably strong persistence at the top. It does a much better job in terms of the mobility of the sons of Low educated fathers than Italy, but mainly in terms of moving those sons to the Middle education level rather than the High level.

We present the same plot for mothers and daughters for Italy and Germany in figure 12. Interestingly, the two countries show quite similar degrees of persistence at the bottom of the education scale for daughters, though, of course, this Low level of education represents a much larger proportion of fathers in Italy than in Germany. Persistence at the High education level for Italy is the highest among our countries. Again, Italy appears to have a rigid educational system. For daughters, Germany is also rigid at all levels.

# Father-Son Mobility by Education Level

Italy/Germany have highest/lowest rates of low educ. father  
 Italy is more “stuck at the bottom” while Germany more “stuck at the middle”

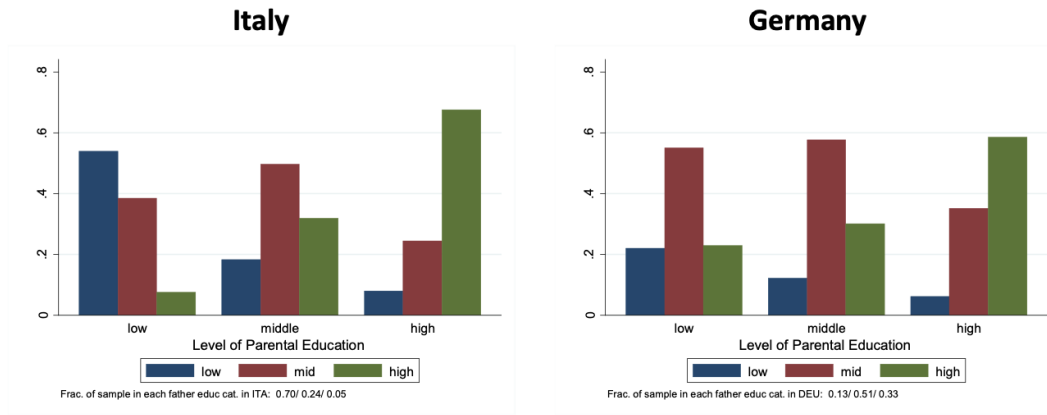


Figure 11: Education Levels of Sons by Father’s Education Level, Italy and Germany, PIACC

# Mother-Daughter Mobility by Education Level

Daughters in Germany are stuck at the bottom and the middle

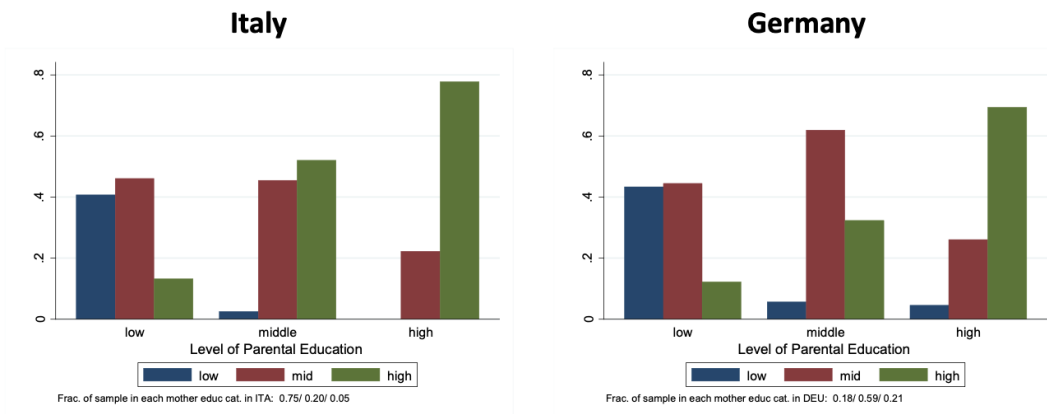


Figure 12: Education Levels of Daughters by Mother’s Education Level, Italy and Germany, PIACC

Figure 13 presents the same intergenerational mobility plots for fathers and sons in Canada and Sweden - two countries with very similar values of the absolute mobility measure. For Canada, the noteworthy feature of the plots is the fact that the High education category has the highest proportion among sons for 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, that high measure stems from one of the highest rates of moving sons from Low education backgrounds into the Middle education level.

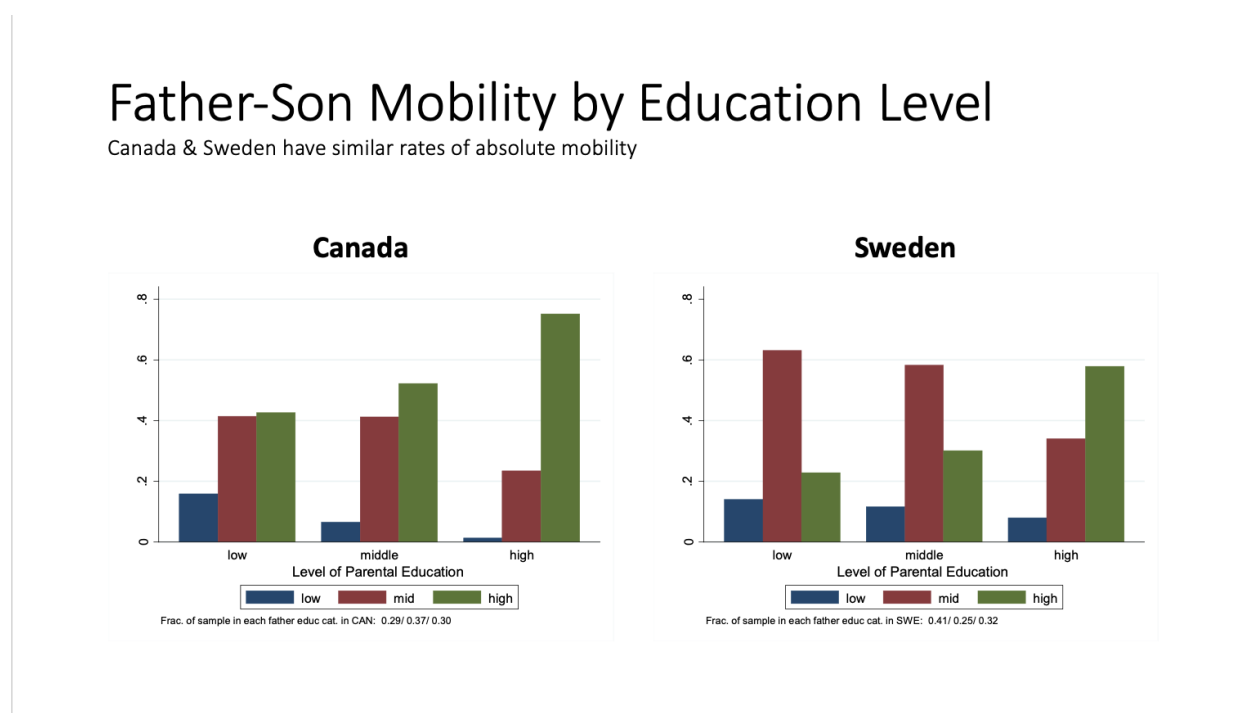


Figure 13: Education Levels of Sons by Father's Education Level, Canada and Sweden, PIACC

We present the same mobility plots for the US and the UK in figure 14. 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.<sup>13</sup> 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 the Middle level). What separates the UK from the US is its higher rate of moving sons with Low and

<sup>13</sup>Interestingly, the gap between the percentage of children from families with annual incomes over \$100,000 attending university and the same percentage for children with annual incomes under \$20,000 in the US is triple that for Canada.(Belley et al. (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.

Middle education fathers into High education.

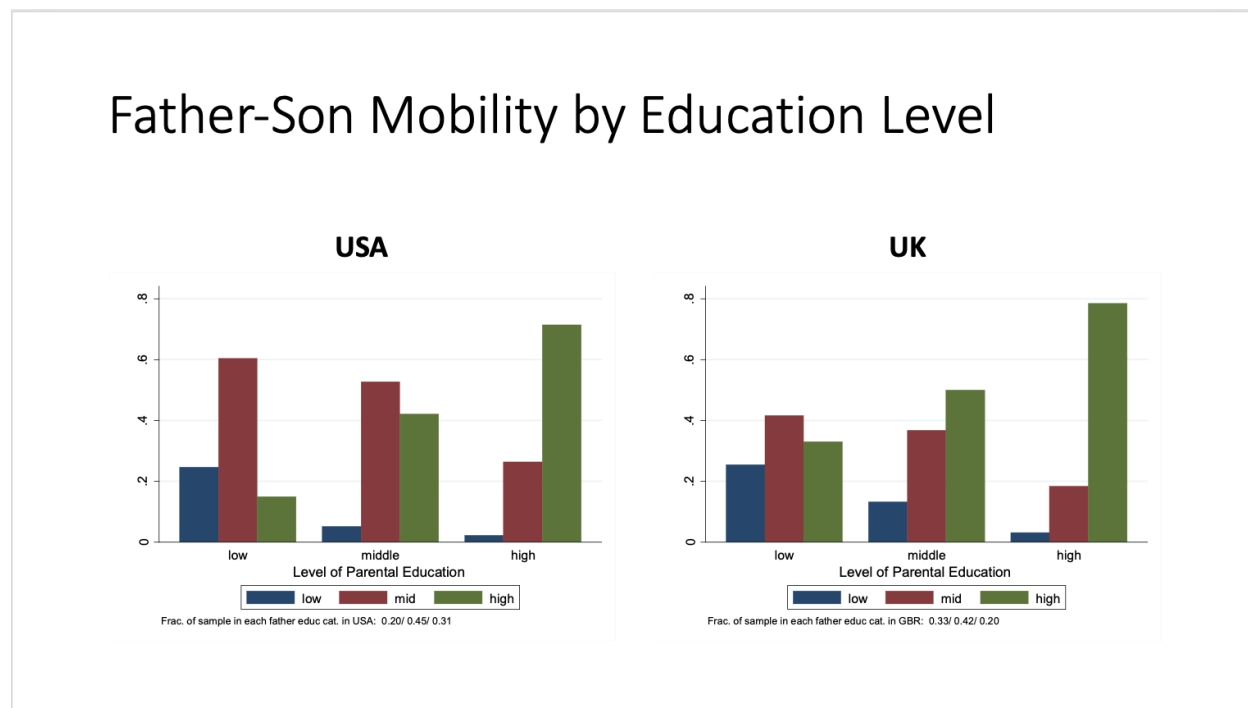


Figure 14: Education Levels of Sons by Father’s Education Level, US and UK, PIACC

## 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 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. From the first column of Table 1, this is particularly true of the countries with high shares of fathers who are Low educated - the correlation between the proportion of fathers who are Low educated and the probability the son of a High educated father is High educated is .77. Thus, the economies to the left of the range in figure 7 - Italy and Spain - appear to have particularly rigid educational systems at all levels.

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 the OECD education maps (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.<sup>14</sup> 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 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 has a correlation of .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. 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 the son of a Low educated father is Middle educated. It appears from this that educational systems either open up access to skilled trade type jobs (doing this through creating associated streams in secondary school) or open up access to universities - not both. We will call the systems which put an emphasis on secondary school streams and access to skilled trades the Blue Collar school system type (epitomized by Germany), and the systems which put an emphasis on access to university as the Reach for the Top school system type (epitomized 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. In the next section, we investigate the relationship between the measures that help define these systems - the streaming measure, the probability the child of a Low educated parent moves to the Middle education level, the probability the child of a Low educated parent moves to the High education level, and the probability the child of a High educated parent is High

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<sup>14</sup>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 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.

educated - and measures of income inequality.

Table 1: Educational Mobility and Streaming: Sons

	Father Low	Streaming Factor	Prob son of Low Ed Father is Mid Ed	Prob son of Low Ed Father is High Ed	Prob son of High Ed father is High Ed
Father Low	1	.	.	.	.
Streaming Factor	-0.029 (0.92)	1	.	.	.
1) Prob Son of Low Ed Father is Mid Ed	-0.69 (0.004)	0.37 (0.17)	1	.	.
2) Prob Son of Low Ed Father is High Ed	0.53 (0.04)	-0.33 (0.23)	-0.91 (0.23)	1	.
3) Prob Son of High Ed Father is High Ed	0.77 (0.001)	-0.002 (0.99)	-0.25 (0.37)	0.21 (0.44)	1

Standard errors in parentheses

The mobility measures are calculated as the proportions of each type minus the proportion of son's 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 generation who are Middle educated. Source: Calculations from PIACC data.

Table 2 presents the same correlation but examining mobility measures for daughters. In this table, we use mobility measures of daughters relative to their fathers rather than their mothers because the fathers were more likely to have been working and to have more education, making them a potentially better marker for young women deciding on education and work. The patterns in this table are quite similar to the ones in the table for sons. Once again, there is a strong correlation between fathers being in the Low income category and the probability the daughter of a High educated father is herself High educated.

### 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

Table 2: Educational Mobility and Streaming: Daughters

	Father Low	Streaming Factor	Prob daught of Low Ed Father is Mid ED	Prob daught of Low Ed Father is High Ed	Prob daught of High Ed father is High Ed
Father Low	1	.	.	.	.
Streaming Factor	-0.029 (0.92)	1	.	.	.
1) Prob Daught of Low Ed Father is Mid Ed	-0.20 (0.47)	0.24 (0.40)	1	.	.
2) Prob Daught of Low Ed Father is High Ed	0.28 (0.30)	-0.21 (0.45)	-0.984 (0.0001)	1	.
3) Prob Daught of High Ed Father is High Ed	0.76 (0.001)	-0.078 (0.978)	-0.34 (0.21)	0.40 (0.14)	1

Standard errors in parentheses

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 generation who are Middle educated. Source: Calculations from PIACC data.

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 education fathers have earnings that place them in either the 3rd or 4th quintile of the child’s generation earnings distribution (representing the upper middle of the distribution) or the 5th quintile (representing the top).<sup>15</sup> The quintiles correspond to the conditional (on working) earnings distribution. In x, we also present the relationships between the streaming factor and the probability a son or daughter is employed. The sons show a weak positive relationship and the daughters show a weak negative relationship.

In figure 15, we plot the Streaming Factor value against the probability that the child of a low educated father is in the third or fourth quintiles of their earnings distribution by country. The left panel plots this for daughters and the right panel plots this for sons. We focus on father’s education in both cases because women in the parents’ generation had less education variation. 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

<sup>15</sup>Note that in the World Bank’s Global Database on Intergenerational Mobility (GDIM), most countries do not have true longitudinal income data and, so, they compute parental income based on their education.(GDIM(2018)) 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.

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 16, we repeat this exercise for transitions to the fifth quintile of the child’s distribution. The correlation is non-existent for sons but becomes strongly negative for daughters. That is, streaming has little earnings impact for sons but seems actually detrimental for daughters.

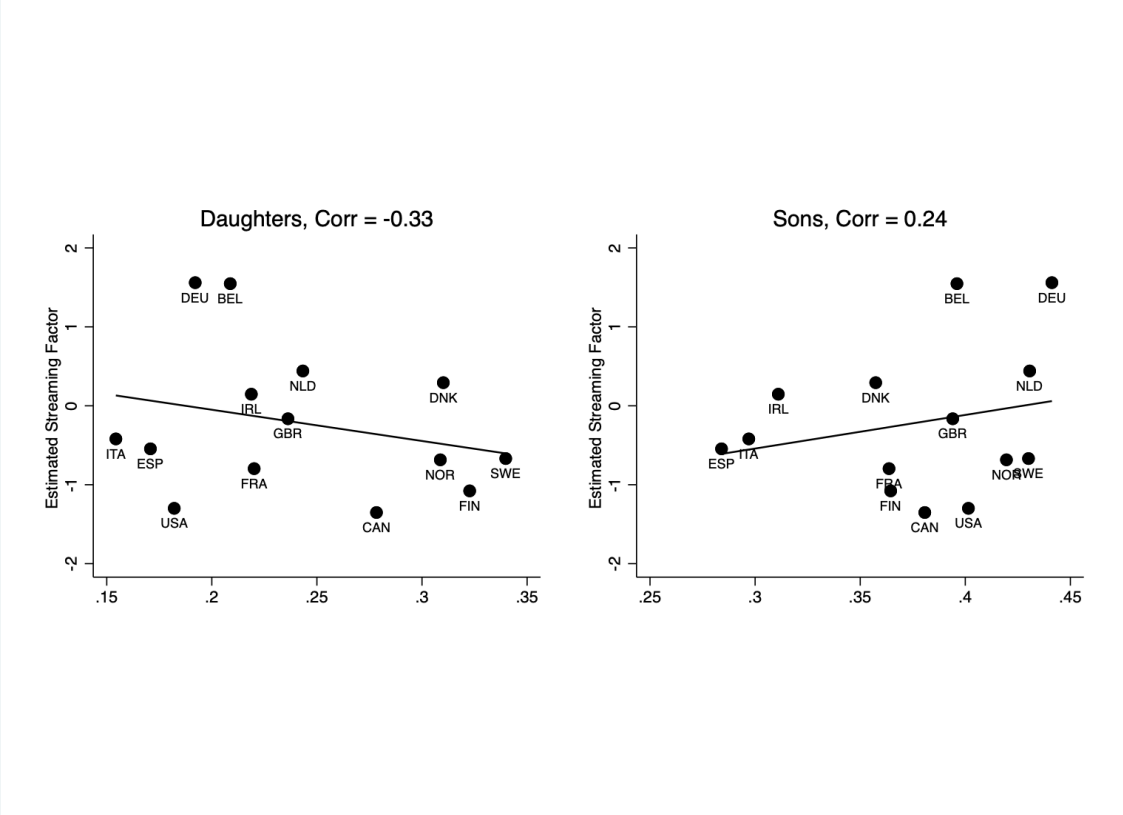


Figure 15: Plots of Streaming Factor vs Probability the Child of a Low Educated Father is in the Third or Fourth Quintiles of Their Earnings Distribution

In figure 17, 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 15.

The other key feature of educational systems that we’ve 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 3, we present cross-country correlations between measures of



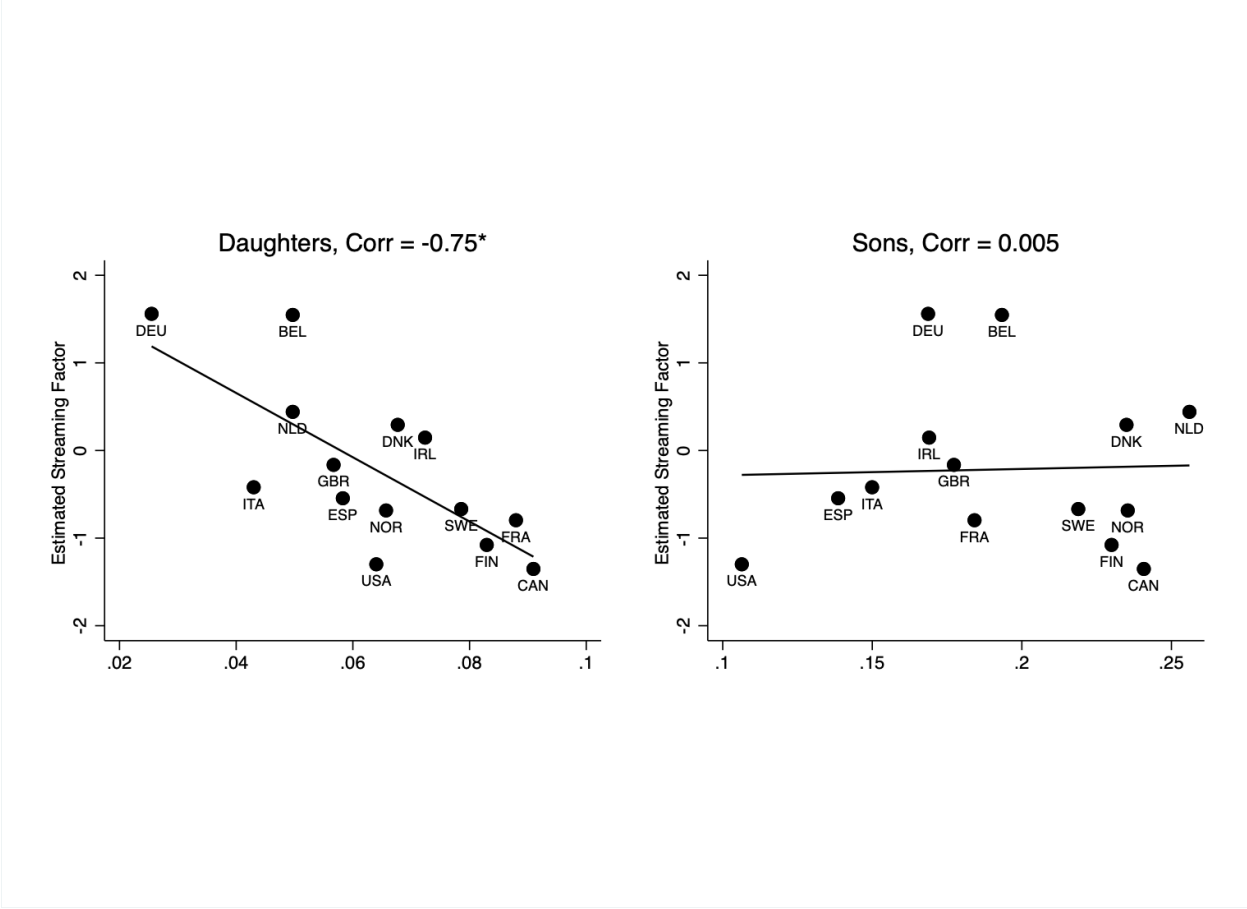


Figure 16: Plots of Streaming Factor vs Probability the Child of a Low Educated Father is in the Fifth Quintile of Their Earnings Distribution

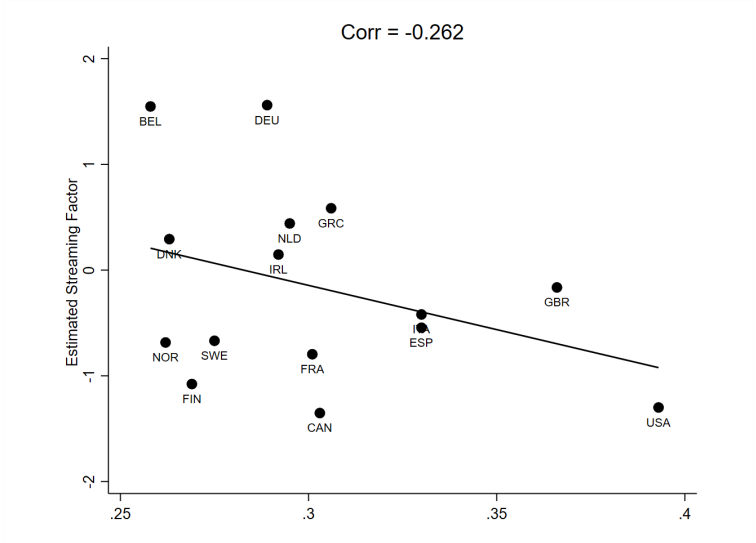


Figure 17: Plots of Streaming Factor vs Gini

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 fathers) to the top (for daughters) of the education system is 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 nonemployment 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 are 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.

Table 3: Education and Income Intergenerational Mobility

	<b>Father to Child Education Mobility:</b>	
	% Daughter High Ed Given Father Low	% Son High Ed Given Father Low
<b>Earnings mobility:</b>		
Bottom Half to Non-employed	-0.56* (0.028)	0.022 (0.37)
Bottom Half to Quint 3 or Quint 4	0.73* (0.002)	0.095 (0.73)
Bottom Half to Quint 5	0.64* (0.01)	0.60* (0.02)

Notes: Standard errors in parentheses. \* significant at 5% level.  
Source: Calculations from PIACC data. ‘Earnings’ mobility measures are from PIACC and show the proportion of children who are either nonemployed or in certain quintiles of the conditional (on working) earnings distribution given that their father is low education and, therefore, assumed to be low earnings.

In figure 18, 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  $-.21$  to  $-.53$  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 USA, 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.

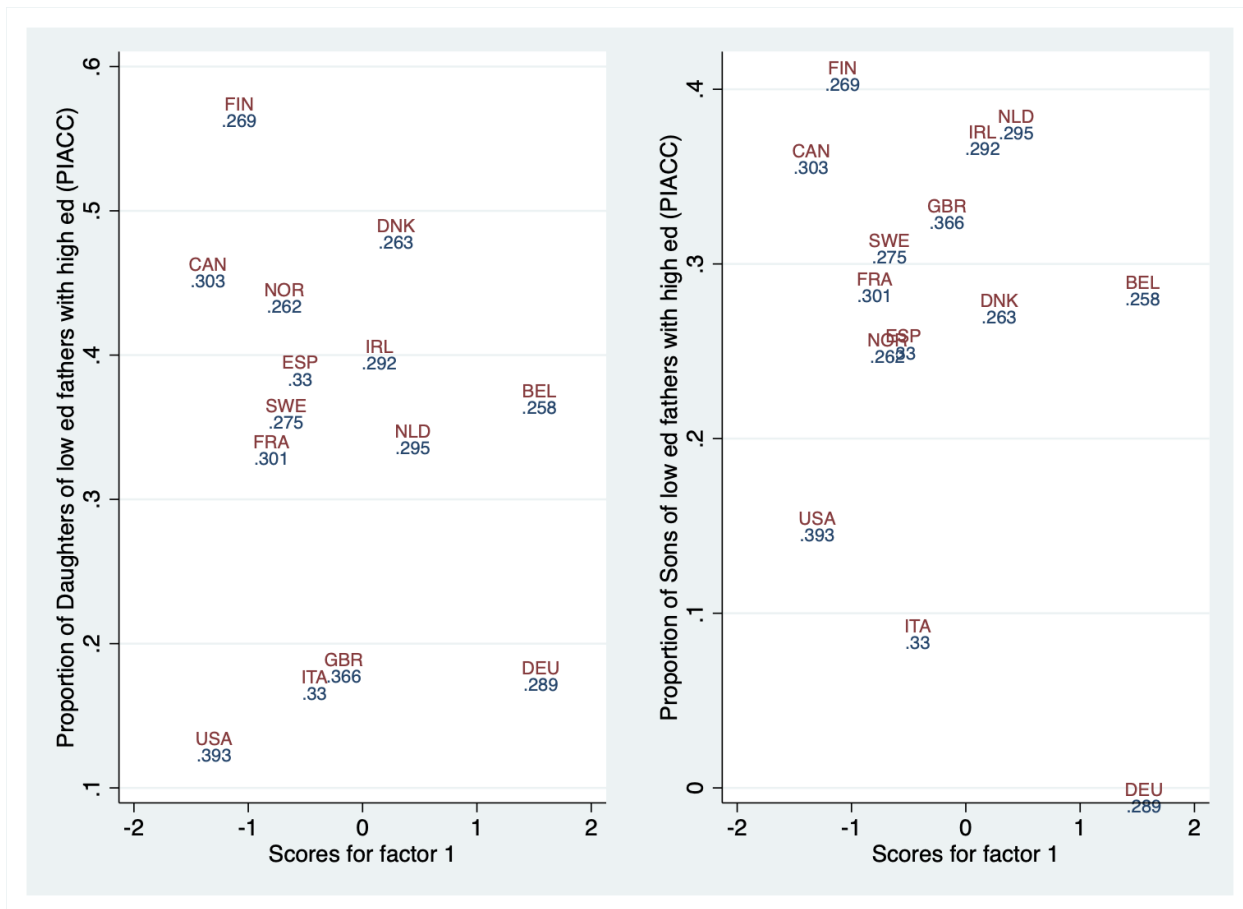


Figure 18: Probability of Child of Low Educated Father Being High Educated vs Streaming Factor, with Gini Values

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 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 4, with the first two columns containing regressions using daughters' mobility measures and the next two columns using sons' mobility measures. The first column 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% 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. Standardized 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 standardized coefficient of -0.61, so the Low to High mobility measure has the strongest association with inequality. As we saw in the figure, the countries with low streaming and low bottom to top educational mobility - notably, the US and Italy - are the highest income inequality countries. From the third column, the system measures have associations with inequality that are in the same direction and of similar magnitude for sons. In the second column, 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 et al. (2021)) The small estimated effect 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 more opportunities - either through trades training type options or access to university degrees - tend to do better in terms of inequality.<sup>16</sup> 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 (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 high income inequality countries. This doesn't 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.

We also investigated measures of other key outcomes using measures constructed from

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<sup>16</sup>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 et al. (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.

Table 4: Regressions of Income Inequality on Education Systems Measures

	Gini Coefficient			
	Daughters	Daughters	Sons	Sons
Streaming Factor	-0.015 (0.013)	-0.015 (0.014)	-0.022* (0.014)	-0.025* (0.014)
Ed: Low to High	-0.27** (0.11)	-0.27** (0.12)	-0.26* (0.13)	-0.25* (0.12)
Ed: 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
N obs	14	14	14	14

Notes: Standard errors in parentheses. \*(\*\*) statistically significant at 10 (5) % level.

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 generation who are Middle educated. Source: Calculations from PIACC data.

the PIAAC. In particular, we re-ran the regressions replacing the Gini coefficient with either the number of jobs a person had held in the previous 5 years or the proportion of people who say they have some flexibility in their hours of work. Neither measure demonstrated any consistent pattern with respect to our school system variables.

## 7 Examining Respect with Homogamy Measures

In our discussion of the justice centred goals of education policy, we argued that focusing on the promotion of self and social respect is a way to operationalize 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 educational systems to educational homogamy - the

tendency of people to marry a person from their same educational group.<sup>17</sup>

We use data on marriage patterns from a variety of sources, all focusing on marital patterns of people under age 40 in the early 2000's.<sup>18</sup> 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 19. 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 relatively low likelihood of marrying more educated men in all countries.

Figure 19 shows a strong positive relationship between the extent to which country's education systems stream students in the middle levels and the extent of upward marrying of low education women. Recall that more streaming tends to be associated with more intergenerational mobility from the bottom into the third quartile of the earnings distribution for boys. Figure 19 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 the lower education group members.

In figure 20, we focus on homogamy at the top - the probability a university educated woman marries a university educated man. Again, we subtract off the proportion of men who

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<sup>17</sup>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.

<sup>18</sup>The data is 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.

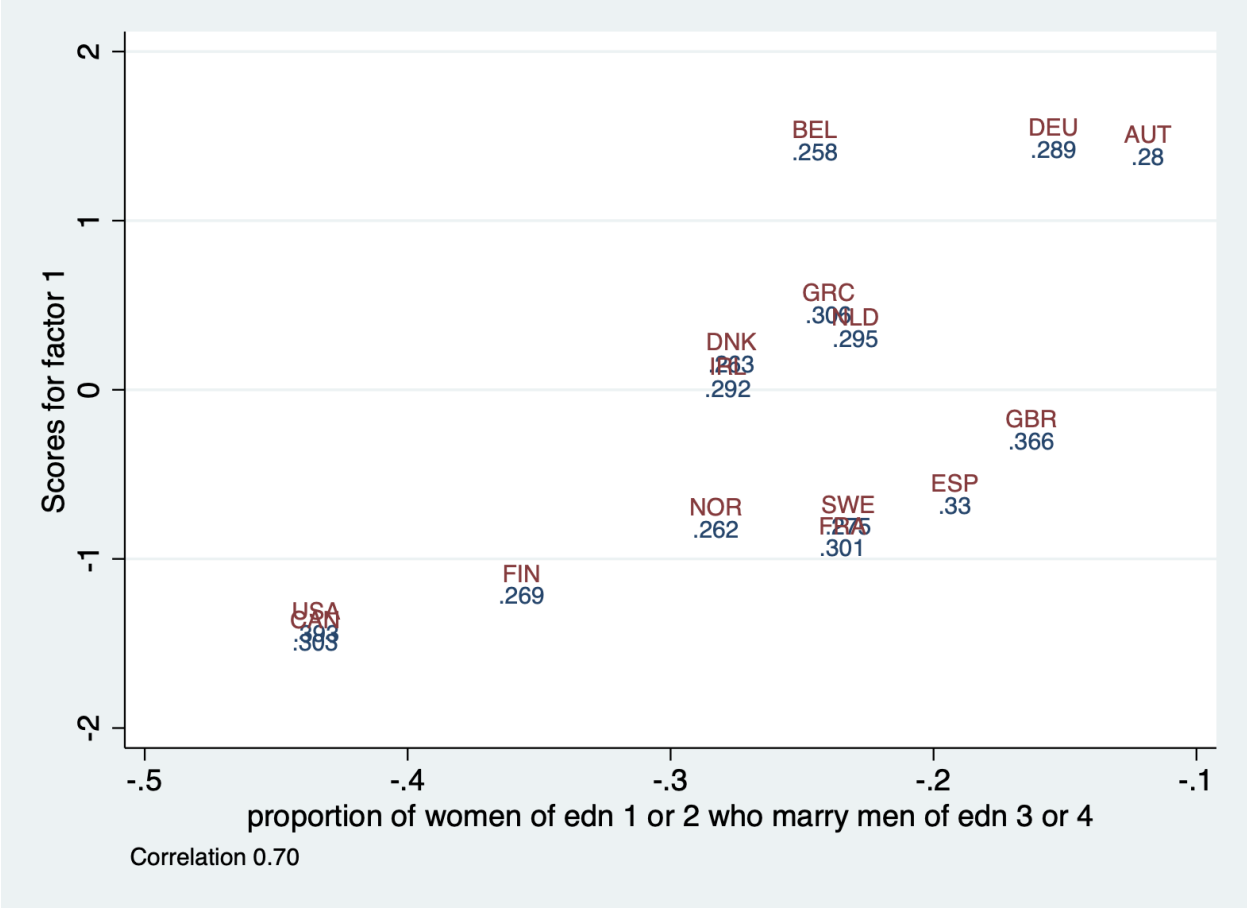


Figure 19: Probability of a High School Drop-out Woman Marrying a Secondary or More Educated Man vs Streaming Factor, with Gini Values



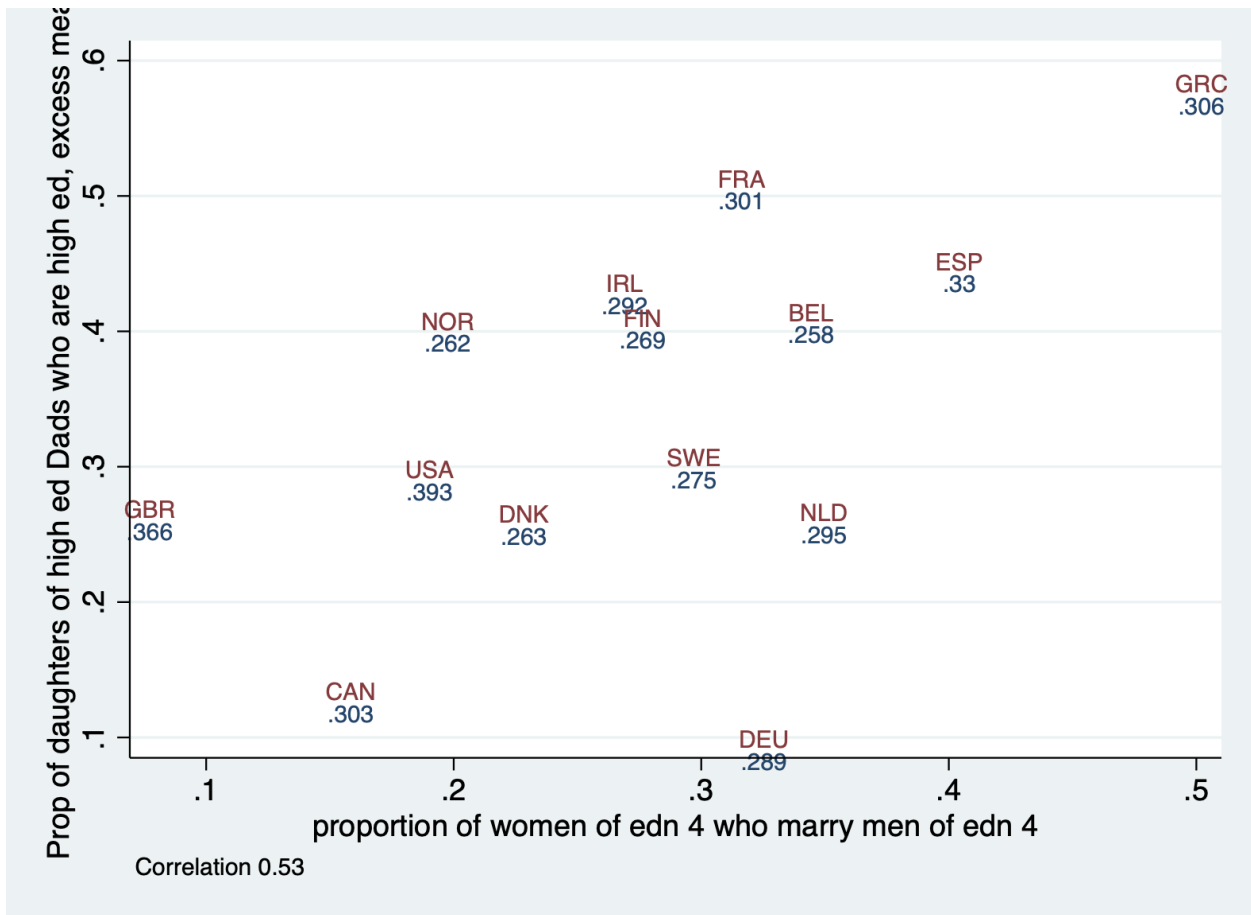


Figure 20: Probability of a University Educated Woman Marrying a University Educated Man vs Probability the Daughter of a High Educated Father is High Educated (Excess Measure), with Gini Values

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.<sup>19</sup> 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 et al. (2012)) This figure suggests that education systems that protect participation at the top level also tend to be more polarized in terms of social interactions. It is interesting to note that 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 like Germany and Austria that are 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 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 marriage. We interpret those patterns as suggesting that systems that open more opportunities in terms of 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 school 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

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<sup>19</sup>This fits with findings in Katrnak et al. (2012) that general measures of educational hypergamy and educational mobility are positively related in a sample of European economies.

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 (-.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 like Belgium provide clear counter-examples). Another hypothesis is that higher levels of inequality make the returns to marrying a highly educated partner higher and incentivize the more educated families to focus their children on marrying high educated partners. (Schwartz and Mare (2005)) But the Gini coefficients in figure 20 show no particular pattern between high end homogamy and levels of inequality.

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 Deaths of Despair

Our original interest in streaming elements of education systems came partly out of concerns expressed in Case and Deaton (2020) that high rates of deaths of despair (deaths from suicide or poisoning from drugs or alcohol) in the US are potentially associated with a lack of opportunity in regions of the country where good paying jobs for lower educated workers have ended. Is it possible, following from this, that deaths of despair are lower in countries with strong options for children of lower education/income families? In our taxonomy of education systems, better options could come in the form of access to trades jobs (which is associated with early streaming in the education system) or from access to university (what we called the Reach for the Top option).

To examine this question we relate our education systems variables to rates of deaths of despair from OECD (2020). This data provides age-standardized rates of death of despair per 100,000 people for OECD countries. In contrast to our hypothesis, we find no evidence of a strong relationship between deaths of despair and our measures of education systems. Based on this data, the US (as is well known) has relatively high rates of deaths of despair, but so, too, do Austria and Belgium (two countries that have substantial streaming into trades opportunities) and Finland (one of the top countries in terms of opening opportunities for children from lower education backgrounds to go to university). Thus, at the very least, there is not a simple association between our measures of opportunity in the education system and

deaths of despair.

## 9 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 the 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 subsidizing 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 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 characterized 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 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 goal should be to move toward being a more just society and, further, that providing the bases of self 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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