Intergenerational Social Mobility in OECD Countries*

by

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This paper assesses recent patterns of intergenerational social mobility across OECD countries and examines the role that public policies can play. It shows that the relationship between parental or socio-economic background and offspring educational and wage outcomes is positive and significant in practically all countries for which evidence is available. Intergenerational social mobility is measured by several different indicators, since no single indicator provides a complete picture. However, one pattern that emerges is of a group of countries, southern European countries and Luxembourg, which appears to rank as relatively immobile on most indicators, while another group, the Nordic countries, is found to be more mobile. Furthermore, public policies such as education and early childcare play a role in explaining observed differences in intergenerational social mobility across countries.

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This paper assesses recent patterns in intergenerational social mobility across OECD countries, examining the role that policies can play in affecting such mobility. Intergenerational social mobility refers to the relationship between the socio-economic status of parents and the status their children will attain as adults. A society can be more or less mobile depending on whether this relationship is, on average, looser or tighter: in a relatively immobile society an individual's wage, education or occupation will tend to be strongly related to those of his/her parents. Intergenerational mobility reflects a host of factors, including inherited traits, social norms and public policies that may influence the individual's willingness and ability to seize economic opportunities. These factors are difficult to unbundle precisely and, as regards norms and policies, to some extent reflect societal choices over institutional settings as well as differences in choices over redistribution and equity, which are likely to be valued differently across countries. Therefore, no "benchmark" mobility level can be identified in cross-country comparisons.

Nonetheless, removing policy-related obstacles to social mobility can be advocated on equity and efficiency grounds because it can improve equality of economic opportunities and the way a society allocates human resources. Promoting intergenerational social mobility means providing individuals with the same opportunities *ex ante*, even though it does not imply that all individuals should achieve the same outcomes *ex post*. Furthermore, policies that affect social mobility are closely related to growth. The ability of an economy to allocate human resources to their best use can have important effects on economic performance. However, trade-offs can exist between policies that remove obstacles to social mobility and those that strengthen other drivers of growth. Therefore, understanding the role played by public policies *vis-à-vis* social mobility can help design policies that enhance equality of opportunity without adversely effecting economic growth. This could even enhance growth and equality of economic opportunities across generations.

The socio-economic status of parents can influence that of their children in two main ways: directly by affecting their labour productivity and labour market attachment and indirectly by facilitating their success on the labour market by other means (*e.g.* by the transmission of social norms such as work ethic or social networks). In turn, labour productivity of children is, to a large extent, determined by parents' investment in their human capital and children's ability to seize educational opportunities. One empirical challenge is to separate the direct productivity channel from indirect ones. Arguably, both can be influenced by public policies, *e.g.* education, redistributive and labour, or product market policies.

Intergenerational transmission of social status is usually measured as "wage or income persistence", *i.e.* the fraction of parental income or wages reflected in their offspring's income or wages. Measuring and comparing wage or income persistence across countries is made difficult by the lack of comparable cross-country data, especially of parents. Against this background, and given that education is a key transmission mechanism in intergenerational social mobility and matching skills with societal needs, this paper focuses

primarily on the role of education as a driver of mobility across generations. Its main contribution is to provide comparable estimates of intergenerational wage and educational mobility across OECD countries, focusing on the following concepts of mobility:

● The influence of parental background, as measured by educational achievement of parents, on wages and educational attainment of various cohorts of adults for 14 European OECD countries.

● The influence of parental background, as measured by a composite index of their socio-economic status, on cognitive achievements of 15-year-old students in 30 OECD countries.

The analysis draws on existing and new evidence from two main sources of individual-level information: wage and education mobility, using the 2005 Survey of Income and Living Conditions (SILC) poverty module of Eurostat survey data; and the influence of parental background on a teenager's cognitive achievement, using the 2006 OECD Programme for International Student Assessment (PISA) survey data. Though none of these concepts of mobility refers to intergenerational transmission of wages proper, the estimated persistence/mobility measures will be called "wage persistence/mobility" and "education persistence/mobility", respectively.

The paper is organised as follows. Section 1 outlines main findings. Section 2 describes the linkages between family background and wage and education outcomes of individuals, explaining the role of education in determining wage mobility. Section 3 analyses the extent of intergenerational wage and educational mobility across those OECD countries for which data are available. Finally, in light of these mobility patterns, Section 4 uses the same data sources to investigate the cross-country association between a range of public policies (including education, redistributive and labour, and product market) and social mobility and equality of opportunity across generations. Suggestive evidence is provided that the main channel through which policies may influence social mobility is via the link between cross-sectional inequality and intergenerational wage mobility.

1. Main findings

1.1. *Mobility patterns*

In this study intergenerational social mobility is measured by several different indicators (*e.g.* wage persistence, secondary and post-secondary education persistence). However, given the complex nature of social mobility, these indicators do not necessarily provide the same cross-country ranking, suggesting that no single indicator provides a complete picture.

● The influence of parental background on individual earnings varies widely across OECD countries for which estimates are available. Low mobility across generations, as measured by a close link between parents' and children's earnings, is particularly pronounced in the United Kingdom, Italy, the United States and France, while mobility is higher in the Nordic countries, Australia and Canada.

● Across European OECD countries covered by the analysis, there is a substantial wage premium associated with growing up in a higher-educated family and a penalty with growing up in a less-educated family, even after controlling for a number of individual characteristics. The premium and penalty are particularly large in southern European countries, the United Kingdom, Luxembourg and Ireland (a premium of 20% and penalty of

16% or more). In general, wage persistence across generations, measured as the difference between the wage premium and penalty, is slightly stronger for sons than for daughters.

- The influence of parental socio-economic status on student achievement in secondary education also differs across OECD countries. It is particularly strong in the United States, France and Belgium, while weaker in some Nordic countries, Korea and Canada. In over half of the OECD countries, including all the large continental European ones, student cognitive skills are more strongly influenced by the average socio-economic status of parents of other students in the same school, *i.e.* the schools' average socio-economic environment, than by their own parents' socio-economic status.

- Inequalities in secondary cognitive skills are likely to translate into inequalities in post-secondary educational achievement and subsequent wage inequality in the labour market. Indeed, in European OECD countries, students from a higher-educated family are more likely to achieve tertiary education, while there is a probability penalty associated with growing up in a less-educated family. The increase in the probability of achieving tertiary education is particularly strong in Luxembourg, Italy, Finland and Denmark, where it is 30 percentage points higher for a son whose father had tertiary education than for a son whose father had only upper-secondary education. Furthermore, transmitted inequalities in education are positively associated across countries with inequalities in wages.

- In all European OECD countries covered by the analysis, the probability of achieving below secondary education is on average 18 percentage points higher for children whose father had below upper-secondary education compared with those whose father had upper-secondary education. Conversely, the probability of achieving below upper-secondary education decreases on average by 10 percentage points for offspring of tertiary educated fathers compared with children whose father had upper-secondary education.

1.2. Intergenerational mobility and inequality

- Intergenerational social persistence, as measured by a close link between parental education achievement and children's wages, is correlated across countries with cross-sectional inequality and poverty. The association between parental socio-economic status and teenager cognitive achievement is stronger in countries with a greater share of children living under the poverty line or lacking basic material resources.

1.3. Policies and mobility

- Higher enrolment in child care and early childhood education correlates with a lower influence of parental socio-economic background on teenager cognitive skills, suggesting a positive effect on social mobility. These policies are likely to be most efficient when targeted at children from low-income and/or second-language families.

- Practices that group students into different programmes or curricula according to proficiency level, for instance, early tracking and ability grouping within classes, correlate with a stronger influence of parental socio-economic background on teenager cognitive skills. This reflects a stronger influence of the school socio-economic environment on a student's performance in the case of early tracking practices.

- By contrast, a better matching of school resources with needs, as well as a steeper progression in teachers' wages over their career, are associated with a lower influence of parental background on student achievement, possibly by attracting experienced

teachers to disadvantaged areas. Likewise, a larger share of qualified teachers correlates with lower inequalities transmitted by family background.

● Evidence suggests that increasing the social mix within schools increases performance of disadvantaged students with neutral or in some cases positive effects on overall performance. Thus, policies aimed at encouraging such a mix in neighbourhoods may mitigate inequalities.

● There is suggestive evidence that universal government-supported loan systems for tertiary education are associated with higher social mobility, as measured by the probability of the offspring of disadvantaged families completing tertiary education. In countries lacking such systems, financial constraints could be an obstacle to achieving tertiary education for students from disadvantaged backgrounds.

● More progressive income taxation and higher short-term unemployment benefits are associated with a looser link between parental background and teenager cognitive skills and wages. This may indicate that well-targeted redistributive and income support policies lower cross-sectional income inequality and poverty rates.

2. Determinants of intergenerational social mobility

2.1. *The linkages between parental background and offspring outcomes*

Intergenerational social mobility can be measured by income, education, occupation or social class. Economic research has traditionally focused on some measure of income or wages.[1] Studies assessing the association between parent and offspring income focus on pairs of fathers and sons. Ideally, income should be measured by a household's disposable income, as this most directly influences the standard of living of individuals (*e.g.* Chadwick and Solon, 2002; Solon, 2004; Lee and Solon, 2006). In practice, accurate measurement is difficult, as it should take into account the structure of the household, the extent of female participation in the labour market and the different sources of income (*e.g.* earnings, assets, welfare). Therefore, most studies use some measure of wages (Box 1). The extent to which the offspring's wage levels reflect those of the parents (the so-called "intergenerational wage elasticity") is taken as a measure of wage persistence across generations, or lack of intergenerational wage mobility. The higher this elasticity, the lower is intergenerational wage mobility. However, one difficulty in adopting this approach in a cross-country context is that comparable information on wages of parents is seldom available.

Parental background can influence offspring wages (Figure 1) in very general terms, by boosting both offspring labour productivity and successful insertion in the labour market. One way children's productivity, and hence future income, can be enhanced is through the ability of parents to invest in their offspring's human capital. However, wealth and assets passed on from one generation to another, the inheritance of traits that are important for economic success, such as propensities to undertake education, work ethics and risk-related behaviours, as well as local conditions such as growing up in advantaged neighbourhoods, are other important factors (for an overview see d'Addio, 2007).

One empirical challenge is to separate the direct productivity channel from indirect labour market ones. Another more fundamental challenge is to empirically isolate the effect of parental background ("nurture") from that of genetic inheritance of abilities ("nature") on individuals' wages and educational achievement. In general, as in this study, estimates of the impact of parental background on individuals' wages and educational achievement combine these two effects. The relative importance of nature *versus* nurture

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Box 1. **Concepts in intergenerational social mobility**

Measures of intergenerational income mobility are often based on empirical estimation of the intergenerational income elasticity, β, which measures the extent to which offspring income levels, Y_i, reflect those of their parents, Y_i^P, that is:

$$\ln Y_i = \alpha + \beta \cdot \ln Y_i^P + \varepsilon_i \quad .$$

This estimated elasticity is a measure of average intergenerational income persistence. A low value implies that the link between parent and offspring incomes is relatively weak, while a high value implies a relatively strong link. An alternative measure is the partial correlation between parent and offspring incomes, which adjusts for potential differences in the variance of income between the two generations.

Theoretical studies of intergenerational mobility regard long-run permanent disposable income as the most appropriate income concept (*e.g.* Goldberger, 1989; Chadwick and Solon, 2002; Solon, 2004; Lee and Solon, 2006; Haider and Solon, 2006). But basing estimates of persistence across generations on current wages raises some key issues (Solon, 2002). First, measuring permanent income/wages of parents with error leads to inconsistent estimates, causing an underestimation of the true intergenerational elasticity. Second, using current wages of offspring as a proxy for lifetime income can also cause a bias, in particular when looking at individuals at the beginning of their careers (Haider and Solon, 2006). Studies based on such measures of offspring wages tend to find lower elasticity estimates than studies measuring wages further along their careers or life cycles. To overcome these problems, many studies average both parental and offspring wages over several years or measure offspring wages after a few years' experience in the labour market.

Educational persistence is often measured by the correlation between years of schooling or educational achievement of parents and their offspring. However, basing educational persistence on years of schooling assumes that the impact on human capital of an additional year of schooling is the same across generations, and that years of schooling affect human capital in the same way across countries. These problems are overcome by studies that assess educational mobility in terms of qualification or literacy levels achieved, as measured, for instance, by the harmonised cross-country ISCED classification (*e.g.* Chevalier *et al.,* 2007) or by test scores of cognitive skills (OECD, 2007a; Hertz *et al.,* 2007).

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in explaining intergenerational social mobility is far from established (*e.g.* Sacerdote, 2002; Bowles *et al.,* 2002; Plug and Vijverberg, 2005). However, to the extent that genetic inheritability of ability does not vary systematically across countries, such heritability should not influence cross-country variation in wage or educational mobility.

An important part of wage persistence across generations is driven by the effect of parental background on cognitive skills acquired by their children in formal (and informal) education (which influences the offspring's productivity). This includes secondary education and post-secondary education (Figure 1 and Box 2). Indeed, recent studies show that there is a clear connection between intergenerational wage mobility and intergenerational educational mobility, although educational mobility cannot account for all the estimated persistence in incomes (Blanden, 2008a; Blanden *et al.,* 2005; Solon, 2004). Educational differences tend to persist across generations, and differences in such persistence explain a large share of the cross-country variation of intergenerational wage correlations (*e.g.* Solon, 2004; Blanden *et al.,* 2006; Blanden *et al.,* 2005; d'Addio, 2007). The extent to which education is responsible for intergenerational persistence in wages depends on how strongly

Figure 1. **Some links between parental background and their offspring's outcomes**

Social mobility – The explored links
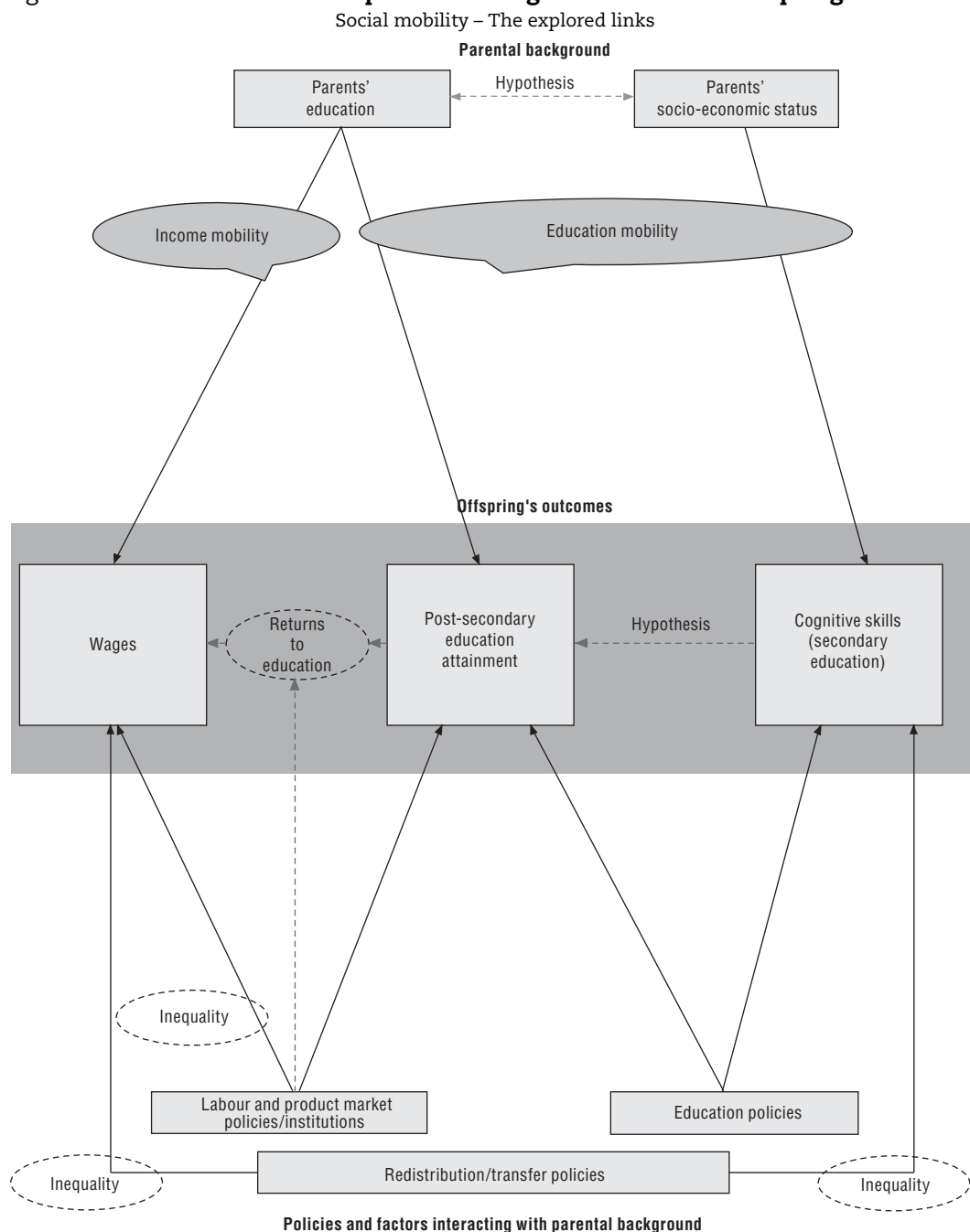
educational achievement is tied to family background, that is, the degree of persistence in education. Of course, the intergenerational wage link is also affected by the returns to education in the labour market (*e.g.* Solon, 2004; d'Addio, 2007).[2] It is likely that inequalities in cognitive skills acquired in secondary education translate into inequalities in achieving post-secondary education and into wages via the returns to education in the labour market.

Box 2. **Education as a determinant of intergenerational social mobility**

Several recent studies analyse the link between intergenerational persistence in education and income (*e.g.* Solon, 2004). In these studies the offspring's investment in education, which drives intergenerational income mobility, depends on family income.

Educational attainment varies with parental income due to both differing endowments (propensity to undertake education and possession of a work ethic) and differing private investment in education across families. If all families had full access to perfect capital markets, only inheritable traits would influence mobility (Becker and Tomes, 1979). But if parents cannot borrow against their children's future earnings to finance their education, liquidity-constrained parents will invest sub-optimally in their children's education (Becker and Tomes, 1986; Grawe and Mulligan, 2002). Additionally, parental investment in education increases in the return to human capital investment, since parents are more inclined to invest in their children's education when the payoff is higher. Thus, in the presence of financial constraints, wealthier families tend to invest more in their children's human capital, and such investment is increasing in labour market returns (Solon, 2004).

Some of these studies suggest that government spending on education can increase intergenerational mobility (Solon, 2004; Mayer and Lopoo, 2008). Progressive public investment in education can offset sub-optimal parental investment in education, to the extent that the offspring of liquidity-constrained parents benefit relatively more from these public programmes. A recent study for the United States shows that intergenerational mobility is greater in high-spending states compared with low-spending states (Mayer and Lopoo, 2008).

Persistence in wages across generations also appears to be positively associated across countries with measures of inequality, *i.e.* of the dispersion of parental backgrounds (see below and d'Addio, 2007, for an overview). Although causality between intra- and intergenerational persistence of inequality is far from established, it is possible that redistributive policies and institutions that narrow the gap between current incomes and/or wages of parents could also mitigate the influence of parental background on wages and educational outcomes of their offspring.

The empirical approach developed in the remainder of this paper has been partly shaped by the considerations above. The analysis of wage mobility measures parental background by fathers' education and their offspring's incomes as gross hourly wages.[3] Basing the estimation of persistence on gross hourly wages implies that the persistence measure reflect the impact of parental education on productivity. While, basing persistence estimates on monthly or annual wages would, in addition to the productivity effect, capture the labour supply decision, *i.e.* the decisions on working hours.

The study of wage mobility is supplemented by the analysis of educational mobility for teenagers (with parental background measured by a broad index of the family's socio-economic status and educational outcomes measured by PISA test scores) and adults (with parental background measured by father's education and offspring educational outcome measured by educational attainment). Finally, the analysis of policy influences on wage and educational mobility focuses on both education and other policies that are likely to affect cross-sectional inequality.

3. Intergenerational social mobility patterns

3.1. *Cross-country patterns in intergenerational income mobility*

3.1.1. *Intergenerational income persistence is significant in all OECD countries*

The relationship between socio-economic status of parents and their offspring is positive and significant in practically all countries for which evidence is available, and for many different aspects of social status (*e.g.* Hertz *et al.,* 2007; Corak, 2004). International comparisons of intergenerational income persistence are relatively common (*e.g.* Solon, 2002; Corak, 2006; d'Addio, 2007). However, these comparisons can be invalid because different studies use different variable definitions, samples, estimation methods and time periods.

Taking the available estimates at face value, cross-country comparison of intergenerational income elasticities based on (various measures of) earnings for pairs of fathers and sons suggests that persistence is higher in the United Kingdom, Italy, the United States and France among the OECD countries for which comparable estimates are available (*e.g.* Corak, 2006; Blanden, 2008b).[4] In these countries at least, 40% of the economic advantage high-earning parents have over low-earning parents is passed on to the next generation (Figure 2). By contrast, intergenerational persistence is comparatively low in the Nordic countries, Australia and Canada, with less than 20% of the earnings advantage passed from parent to offspring.

Figure 2. **Intergenerational earnings elasticity,[1] estimates from various studies: selected OECD countries**
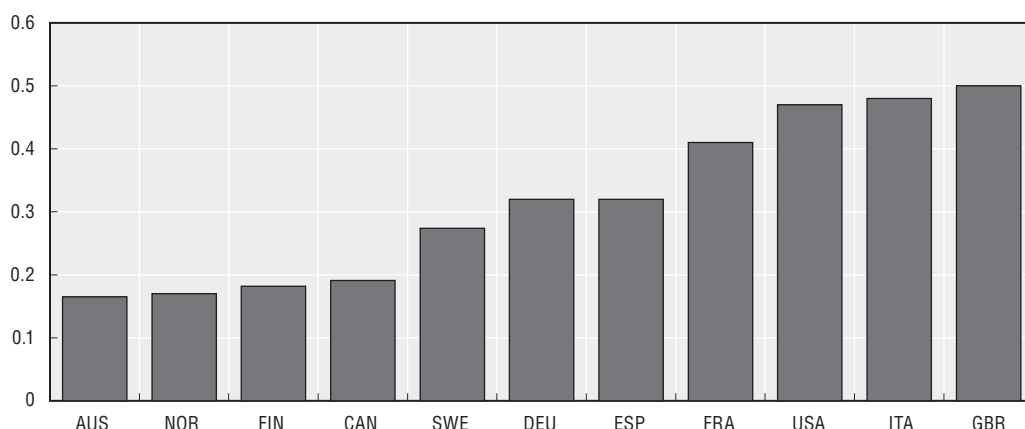

1. The height of each bar measures the extent to which son's earnings levels reflect those of their fathers. The estimates are the best point estimate of the intergenerational earnings elasticity resulting from an extensive meta-analysis carried out by Corak (2006) and supplemented with additional countries from d'Addio (2007). The choice of empirical estimates in this meta-analysis is motivated by the fact that they are based on studies that are similar in their estimation technique, sample and variable definitions. The higher the value, the greater is the persistence of earnings across generations, thus the lower is the intergenerational earnings mobility.

Source: D'Addio (2007).

These patterns of intergenerational persistence are partly confirmed by descriptive evidence based on new comparable data for European OECD countries, which allow systematic comparison of sons' wages to the educational attainment of fathers (see Causa *et al.,* 2009, and Box 3). In all the countries covered, a son is much more likely to be in the top wage quartile if his father had achieved tertiary education compared with a son whose father had only basic (below upper-secondary) education, particularly in Portugal, Luxembourg and the United Kingdom (Figure 3).[5]

Figure 3. **Ratio of the chance of being in the top wage quartile for sons of higher-educated *vs.* lower-educated fathers:[1] Selected European OECD countries**
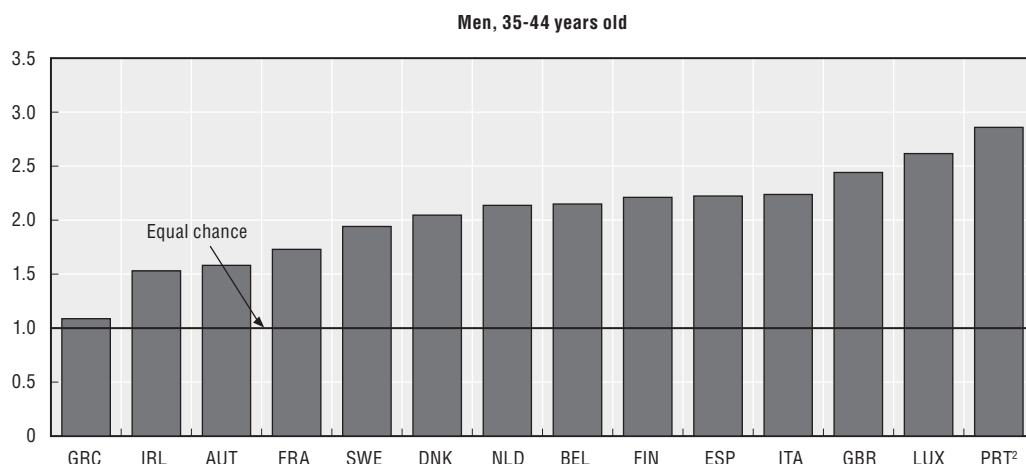
Men, 35-44 years old

Note: Germany is not included in this figure as there is a problem with the representativeness of the German sample along the education dimension.

1. This figure shows the ratio of two conditional probabilities. It measures the ratio between the probability to end up in the top wage quartile given that the son's father had achieved tertiary education and the probability to end up in the top wage quartile given that the son's father had achieved less than upper-secondary education. Probabilities are defined as simple frequency measures. Fathers' educational achievement is a proxy for parental background or wages.
2. 25-34 years old for Portugal.

*Source:* OECD calculations based on the 2005 *EU-SILC Database*.

Box 3. **Measuring the link between parental educational background and offspring wages**

The analysis in Causa *et al.* (2009) is based on the 2005 module on the intergenerational transmission of poverty of the *EU-SILC Household Database*. This poverty module contains retrospective information on parental background when the respondent was a teenager. This information is comparable across European OECD countries and includes family composition, age, educational qualification level, activity status and occupation of mother and father, as well as an indicator of financial distress conditions. However, information on parents' wages is lacking.

The approach taken in this study is to proxy parental background by the highest educational qualification level achieved by the father according to the International Standard Classification of Education (ISCED). One advantage of using father's education as a proxy for his income is that education is likely to be a more permanent feature than current wages, while being highly correlated with wages in most countries. The offspring's income concept refers to gross hourly wages and salaries paid in cash for time worked or for time not worked, such as holidays, as well as additional payments (*e.g.* overtime payments, bonuses). Henceforth, this will be referred to as wages. The results focus on two cohorts of offspring (35-44 and 45-54) and their parents. The youngest cohort (25-34 years old) is excluded because of the potential difficulties associated with measuring permanent wages/incomes at young ages, as discussed in Box 1, as well as with ensuring that the individuals under consideration have reached their desired educational level.

To explore more fully this descriptive evidence through regression analysis, it was assumed that individual wage prospects depend on fathers' educational attainment in two ways: through the direct transmission of factors that affect the economic success of offspring; and through influencing their offspring's educational attainment (see Causa *et al.*, 2009, and Box 4). The first channel, that is, estimates of parameter *a* in equation [1], Box 4, captures the transmission of wealth, work ethic and social norms or networks that

Figure 4. **Wage premium and penalty due to paternal education levels:**[1]
Selected European OECD countries
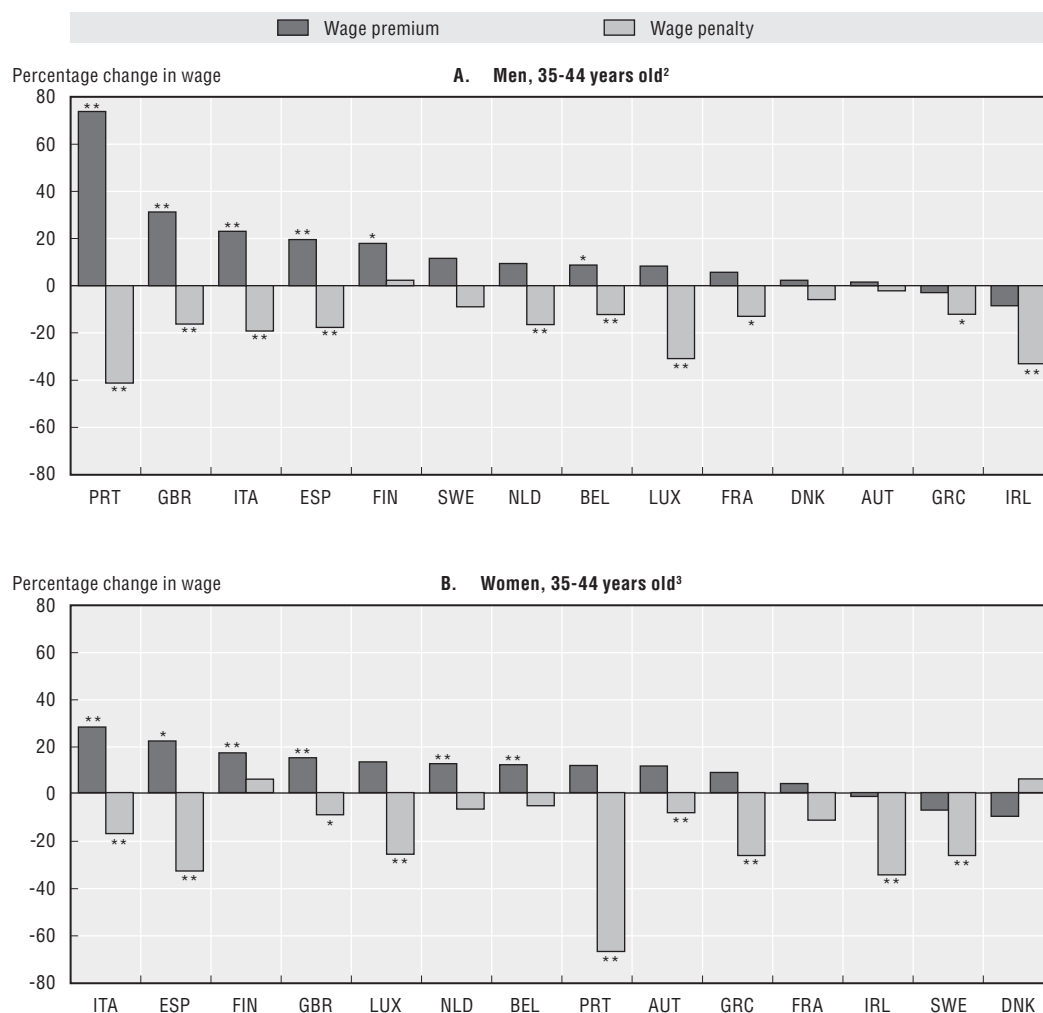
Notes: * denotes statistically significant at 10% at least.
** denotes statistically significant at 5% at least.
Germany is not included in this figure, as there is a problem with the representativeness of the German sample along the education dimension.
1. The figure shows the estimated percentage change in wages of the offspring depending on their parental background measured by father's highest education level. The wage premium is the increase in the offspring's wage of having a father with tertiary education relative to an offspring whose father had upper-secondary education. The wage penalty is the decrease in the offspring's wage of having a father with less than upper-secondary education relative to an offspring whose father had upper-secondary education. Fathers' educational achievement is a proxy for parental background or wage.
2. Based on OLS wage regression model.
3. Based on wage regression model with selection into paid employment (Heckman full maximum likelihood estimation).
Source: OECD calculations based on the 2005 *EU-SILC Database*.

Box 4. **The influence of parental background on offspring wages**

The empirical strategy for assessing the influence of parental background on offspring wages assumes that gross hourly wages (W_i) depend on both the offspring's effort or educational attainment (EC_i) and the influence of father's educational attainment (E_i) (for details, see Causa *et al.,* 2009):

$$\ln W_i = k + a \cdot E_i + b \cdot EC_i + \varepsilon_{i1}, \qquad [1]$$

where a measures the strength of the direct influence of the father's educational attainment on wages (*e.g.* through the transmission of social norms, work ethic, social networks and other factors facilitating the economic success of children) and b the offspring's labour market returns to their educational attainment.

In turn, the offspring's educational attainment is assumed to depend on their fathers' educational attainment, reflecting, for instance, the ability and willingness of fathers to invest in their offspring's human capital as well as other inheritable factors affecting the ability of their children to seize educational opportunities, such that:

$$EC_i = j + d \cdot E_i + \varepsilon_{i2} . \qquad [2]$$

Combining these two equations yields,

$$\ln W_i = e + f \cdot E_i + \varepsilon_{i3}, \qquad [3]$$

where $f = (a + bd)$ captures the total effect of a father's educational attainment on individual wages. This effect is decomposed in a direct effect on wages (a) and an indirect effect through education (bd), which in turn consists of the returns to offspring's own education (b) and the influence of father's educational attainment on their offspring's educational attainment (d).

In the first stage, the total effect of a fathers educational attainment on individual wages, equation [3], is estimated for various cohorts of men and women. The estimation controls for "Mincerian" individual characteristics such as living in an urban/rural area and migrant and marital/cohabitant status. The results are robust to inclusion of age and experience.[1] Ordinary least squares (OLS) estimates of equations [1] and [3] may be biased due to non-random selection into employment, since it is likely that those who are not working constitute a self-selected sample, particularly women who would earn low wages. To overcome this selection problem, this study uses the Heckman sample selection bias estimator for women and OLS for men (*e.g.* Heckman, 1976). However, results for women remain broadly the same under OLS or Heckman estimation techniques.

In the second stage, estimation of equation [1], offspring educational attainment is introduced as an explanatory variable in order to find out whether fathers' educational attainment mainly influences their offspring's wages through influence on education or if it has a direct effect on wages, over and above the effect on education.[2]

In the third stage, the influence of fathers' educational attainment on that of their offspring is explicitly estimated (equation [2]). The empirical results are obtained by estimating an Ordered Probit model, in which observed educational outcomes of individuals (EC_i) are assumed to be driven by an underlying continuous variable measuring their "propensity to achieve education". This underlying variable is assumed to be determined by their father's educational attainment (E_i) and a number of individual characteristics. The results suggest that in all European OECD countries fathers' educational attainment influences that of their offspring (Causa *et al.,* 2009).

1. In "Mincerian" wage equations, age, experience and experience squared are standard controls. Life-cycle effects are not considered in the final estimates because they are not statistically significant in the current setting, due to weak identification within narrowly defined age groups (or cohorts).
2. It is possible that there is a potential endogeneity of own education in this specification due to unobserved variables such as ability and/or motivation, which may be correlated with both education and wages. This would result in an upward bias of the influence of own education on wages. Usually, instrumental variable (IV) estimation is used to address this problem, but it is often difficult to find appropriate instruments, and weak instruments may bias the results further. Indeed, studies using (IV) estimations often find even higher estimates of the influence of education on wages than OLS, which suggests that measurement error in the education variable might be a more serious problem than endogeneity (*e.g.* Card, 2001).

facilitate successful labour market insertion. The second channel, *i.e.* estimates of parameter *b* in equation [1], Box 4, captures access to education, as well as the individual propensity to acquire education and genetically transmitted ability to learn, which affect an individual's productivity (*e.g.* Bourguignon *et al.,* 2003). As a first step in the analysis, Figure 4 reports estimates of the overall effect of a father's educational attainment on offspring wages (estimates of parameter *f* in equation [3], Box 4), with no distinction between these channels.

3.1.2. *Wage premium or penalty depending on father's educational attainment*
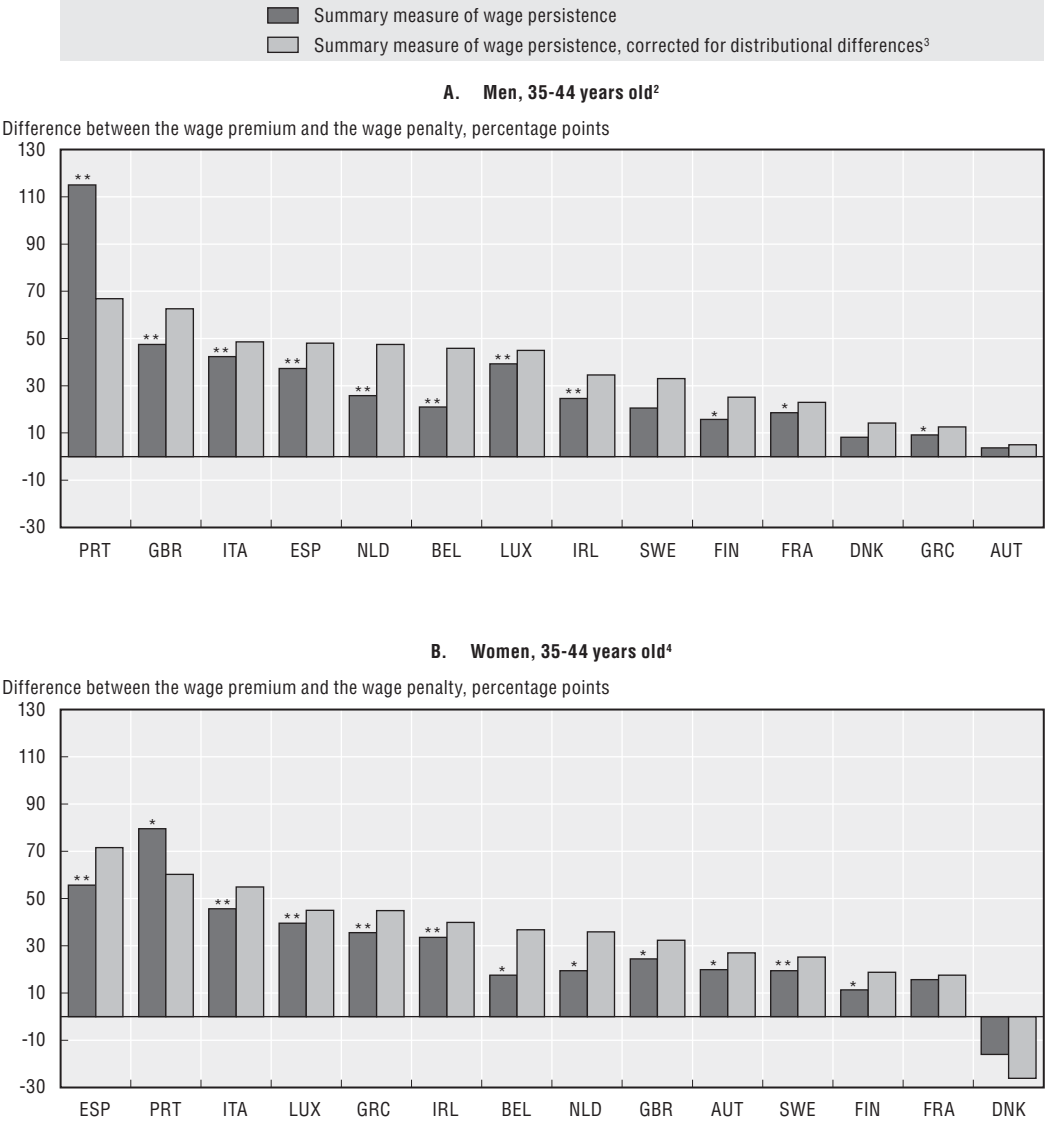
In all European OECD countries covered by the analysis, there is a positive wage premium (measured as the increase in gross hourly wages) for offspring of higher-educated fathers, while there is a penalty (measured as the decrease in gross hourly wages) for offspring of lower-educated fathers (Figure 4). The wage premium is particularly large in southern European OECD countries, the United Kingdom and Finland. In these countries, having a father with tertiary education raises sons' wages by some 20% or more compared with a son whose father had upper-secondary education. At the same time, the wage penalty of having a father with only basic education compared with a father with upper-secondary education appears to be high in the same countries, as well as in Luxembourg and Ireland. In these countries, the wage of a son whose father had below upper-secondary education falls short by more than 16% of the wage of a son whose father had upper-secondary education.[6] The influence of paternal background on daughters' wage premia is, in general, slightly lower than that of sons, yet still substantial. Moreover, for women, the average wage penalty of coming from a disadvantaged background is sometimes much higher than the premium of coming from an advantaged background.[7]

3.1.3. *Summary measure of persistence in wages*

One way of summarising the extent of wage persistence across generations is to measure the gap between the estimated wage premium and the penalty of having a tertiary-educated or below upper-secondary educated father, respectively. A greater gap would imply stronger persistence in wages over generations. According to this measure, intergenerational wage persistence for sons is particularly strong in some southern European countries and in the United Kingdom, while it is lower in some Nordic countries, Austria and Greece (Figure 5). The cross-country ranking of persistence in wages for women is similar to that of men. However, these patterns could be influenced by distributional differences in fathers' educational attainment and individuals' wages, since wider distributions of individual wages (relative to parental background) could mechanically translate into higher persistence estimates. One way of accounting for this is to adjust the estimated wage persistence for cross-country differences in the dispersion of father's education and offspring's wages. The cross-country ranking presented in Figure 5 remains fairly unchanged to this adjustment (the rank correlation between non-standardised and standardised persistence measures is 0.96). The remainder of the discussion in this study refers to the standardised measure of wage persistence.

It is difficult to compare this measure of persistence in wages over generations with existing estimates of the "intergenerational elasticity of income" reported in Figure 1 because the proxy used for parental background in this study is different from what is commonly used (some measure of fathers' wage or income). Even so, the findings in this study are qualitatively in line with existing evidence for pairs of fathers and sons.[8] The

Figure 5. **Summary measure of wage persistence levels:**[1]
Selected European OECD countries

Legend:
- ▮ Summary measure of wage persistence
- ▯ Summary measure of wage persistence, corrected for distributional differences[3]

A.   Men, 35-44 years old[2]

Difference between the wage premium and the wage penalty, percentage points

B.   Women, 35-44 years old[4]

Difference between the wage premium and the wage penalty, percentage points

Notes: * denotes statistically significant at 10% at least.
** denotes statistically significant at 5% at least.
Germany is not included in this figure, as there is a problem with the representativeness of the German sample along the education dimension.

1. Wage persistence is measured as the distance or gap between the estimated wage premium and penalty. Thus, it measures the percentage increase in wages of an offspring having a father with tertiary education relative to an offspring having a father with below-upper secondary education. A larger number implies a larger gap, thus stronger persistence in wages or a higher degree of immobility over generations. Fathers' educational achievement is a proxy for parental background or wage.
2. Based on OLS wage regression model.
3. The summary measure of wage persistence, corrected for distributional differences, corresponds to the summary measure of wage persistence, multiplied by the ratio of the standard deviation of fathers' education to the standard deviation of sons' or daughters' gross hourly wage.
4. Based on wage regression model with selection into paid employment (Heckman full maximum likelihood estimation).

Source: OECD calculations based on the 2005 *EU-SILC Database*.

United Kingdom is estimated to have relatively low wage mobility, while some Nordic countries appear to be more mobile, as frequently found in previous empirical studies (*e.g.* d'Addio, 2007; Corak, 2006). However, there are some differences. For instance, France appears to be much less mobile in terms of the "intergenerational income elasticity" than on the basis of the influence of fathers' education on sons' wages, perhaps reflecting that fathers' education is not a good proxy for parental income in this country.

3.1.4. *The role of education as a driver of persistence*

As a further step in the analysis of wage persistence, an attempt was made to separate the direct influence of a father's educational attainment on their offspring's wages from the indirect effect going through their offspring's own educational attainment (*i.e.* estimation of the relative magnitudes of coefficients a and b in equation [1], Box 4). The resulting estimates suggest that parental background mainly influences offspring wages through their own educational attainment (*i.e.* by indirectly influencing offspring productivity) except in a few countries (the United Kingdom, Spain, Italy, Netherlands, Luxembourg and Ireland) where direct linkages appear to be more important than the indirect ones through education. More specifically, in most countries fathers' educational attainment (estimates of coefficient a in equation [1], Box 4) is no longer important (*i.e.* significant) in determining sons' wages once the sons' educational attainment is taken into account. This result is even more pronounced in the case of women (Causa *et al.,* 2009, for details). Thus, education is a key factor explaining persistence in wages across generations in many countries and policies providing equal opportunities in access to education are essential in enhancing social mobility.

3.2. *Cross-country patterns in intergenerational education mobility*

Given that individuals' educational attainment appears to be a key driver of wages in European OECD countries, it is important to understand to what extent skills acquired in formal education, including secondary and post-secondary, are influenced by parental background. Moreover, differences in secondary educational achievement due to parental background may contribute to differences in post-secondary achievement which, in turn, can lead to persistence in wages. To this end, this section analyses cross-country patterns of intergenerational education persistence in secondary education for teenagers, followed by persistence patterns in post-secondary education for adults.

3.2.1. *Parental background influences student achievement in secondary school*

The extent to which parental background, measured by a broad index of socio-economic status of a student's family, influences student cognitive performance at the level of secondary education differs substantially across OECD countries (Figure 6). Henceforth, when discussing persistence in secondary educational achievement, this refers to the estimated influence of this index on a student's performance on the PISA test score (see Causa and Chapuis, 2009, and Box 5 for details). As in the case of wage persistence, the estimates cannot distinguish between effects of parental background and genetically inheritable factors. France, New Zealand, the Czech Republic, United States and United Kingdom are among the countries where persistence is highest according to this metric, while persistence is relatively low in Iceland, Finland, Southern European countries, Mexico and Turkey.[9]

Figure 6. **The influence of parental background on secondary students' achievement**[1]
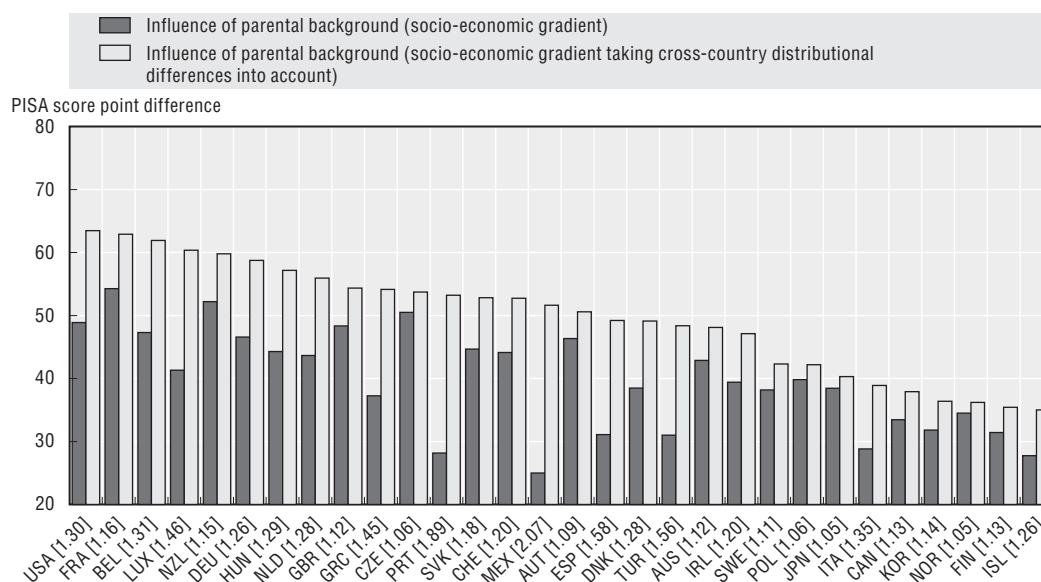
Notes: Socio-economic gradient: change in PISA science score due to an improvement of one international standard deviation in the PISA index of student socio-economic background. Socio-economic gradient taking cross-country distributional differences into account: change in PISA science score due to an improvement of one country-specific, inter-quartile change in the PISA index of student socio-economic background.

Data in brackets are values of the difference between the highest and the lowest quartiles of the country-specific distribution of the PISA index of economic, social and cultural status, calculated at the student-level.

1. Regression of students' PISA science performance scores on their PISA economic, social and cultural status (ESCS), a broad indicator of family's socio-economic background. Country-by-country least-squares regressions weighted by students' sampling probability. Robust standard errors adjusted for clustering at the school level. Regressions for Italy include regional fixed effects.

Source: OECD calculations based on the 2006 OECD PISA Database.

The variation within a country in the distribution of student socio-economic status (parental background) may matter for the overall impact of background on student achievement (OECD, 2007a; OECD, 2004). The cross-country patterns of intergenerational educational persistence change considerably after taking country differences in the distribution of socio-economic status into account (Figure 6).[10] In countries like Mexico, Portugal, Luxembourg, Spain and Turkey, where the dispersion in student socio-economic background is wide, even a relatively mild influence of parental background on their achievement can lead to a large overall difference. After adjusting for the country-specific distribution of socio-economic status, the United States, France and Belgium are countries where parental background has the greatest influence on student achievement. The remainder of the discussion of persistence in secondary education takes these distributional differences across countries into account.

3.2.2. *In many countries the school environment has a large influence on student achievement*

Using a similar approach to PISA 2007 (OECD, 2007a), Figure 7 decomposes the overall influence of parental background on student achievement into an individual background effect ("within-school" effect) and a school environment effect ("between-school" effect).

Box 5. **The influence of parental background on student achievement in secondary education**

The empirical analysis in Causa and Chapuis (2009) is based on the *2006 PISA Survey* which collects a cross-country, comparable microeconomic dataset on student achievement (for details see OECD, 2007a; OECD, 2005a, b). PISA assesses the skills of students approaching the end of compulsory education in 67 countries, including all OECD countries. PISA 2006 measures mathematical, scientific and reading literacy, as well as problem-solving skills of students in each participating country. The target population is 15-year-old students in each country, regardless of the grade they currently achieve and independent of how many years of schooling are foreseen for 15-year-olds by the national school systems. The main focus of the *PISA 2006 Study* is on science literacy, with about 70% of the testing time devoted to this. Given the very high correlation among science, mathematics and reading scores, the analysis in this study focuses on those for science. OECD (2007a) points to the robustness of country-specific and cross-country empirical assessments to the use of either score. PISA scores have an OECD mean of 500 points and a standard deviation of 100 points.

Equity in student achievement is defined by the concept of equality of opportunity (Roemer, 1998, 2004), according to which educational achievement should not reflect circumstances that are beyond a person's control, such as family socio-economic background. The empirical counterpart to this concept is to estimate the so-called "socio-economic gradient", which measures how strongly student educational achievement, measured by PISA test scores, depends on the socio-economic background of the students' families. Specifically, the analysis uses the Index of Economic, Social, and Cultural Status (ESCS) provided by PISA as the measure of parental background.

The PISA ESCS index is intended to capture a range of aspects of a student's family and home background. It is explicitly created in a comparative perspective and with the goal of minimising potential biases arising as a result of cross-country heterogeneity. The student scores on the index are factor scores derived from a Principal Component Analysis which are standardised to have an OECD mean of zero and a standard deviation of one. Thus, the size of the achievement difference between students with high and low values on the ESCS index provides a measure of how fair and inclusive each school system is: the smaller the difference, the more equal are educational opportunities.

In the baseline empirical model the student-level score is regressed upon his or her family socio-economic background:

$$Y_{isc} = \alpha_{1c} + \beta_{1c} \cdot F_{isc} + \varepsilon_{isc}, \qquad\qquad [1]$$

where index i refers to individual, s to school and c to country; Y_{isc} denotes the student science test score, F_{isc} denotes parental background as measured by the ESCS index; ε_{isc} an error term; and β refers to the influence of parental background on student achievement (*i.e.* the socio-economic gradient). Baseline estimations can be enriched to control for a number of individual factors (such as gender, migration and language spoken at home) and school factors (location, resources, size, ownership and funding), allowing comparison of the "gross" and "net" impact of family background on student performance. The estimates take into account the hierarchical and sampling structure of the PISA dataset; specifically, they are based on a clustering-robust linear regression technique, which does not require that individual observations be independent within schools, but only that they be independent across schools (see Causa and Chapuis, 2009, for details). In addition, probability weighting is used to reflect differing sampling probabilities across students within countries.

Box 5. **The influence of parental background on student achievement in secondary education** (cont.)

The influence of parental background on student performance in secondary education can be divided into two parts, the "individual background" effect (F_{isc}) and the "school environment" effect ($\overline{F}_{sc}$), defined as the weighted average of students' socio-economic background weighed by students' individual weights in the school attended by individual i (which is computed excluding the student himself). The empirical approach for estimating the influence of individual background and school environment on student test scores is an extension of equation [1]:

$$Y_{isc} = \alpha_{1c} + \beta_{wc} \cdot F_{isc} + \beta_{bc} \cdot \overline{F}_{sc} + \varepsilon_{isc}. \tag{2}$$

Hence, while parameter β_{wc} refers to the individual's background effect, the parameter β_{bc} refers to the school environment effect. As in equation [1], equation [2] can also be extended to control for student and school-level characteristics.
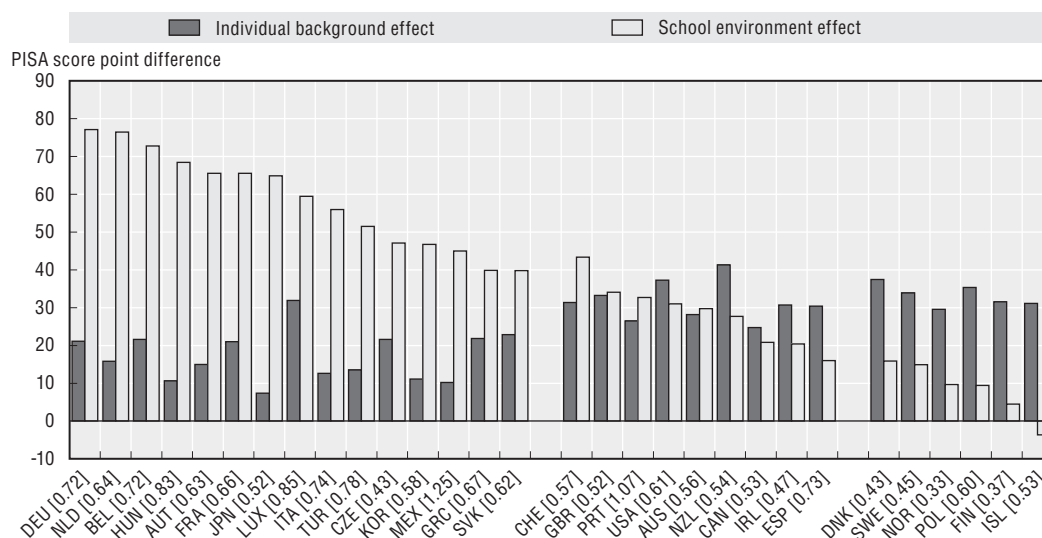

The individual background effect measures the relationship between student socio-economic background and student performance within a given school, while the school environment effect measures the relationship between the average socio-economic status of families of students in a given school and individual student performance, controlling for his/her parental background (Box 5).[11] The school environment effect can be considered as a proxy for the contextual effect arising in the school, reflecting the extent to which student achievement depends on the socio-economic composition of their peer group (see Causa and Chapuis, 2009, for a detailed discussion). Not all of the contextual effect is attributable to peer-group effects; it may also reflect educational school resources and the way students are allocated within a district or region or to classes and programmes within schools (OECD, 2007a).

The numbers presented in Figure 7 represent, respectively: i) the increase in a student's PISA score obtained from moving the student from a school where the average socio-economic intake is relatively low to one where the average is relatively high; and ii) the increase in a student's PISA score obtained from moving the student from a relatively low socio-economic status family to one that has a relatively high socio-economic status, while he/she stays in the same school. Comparisons incorporate the impact of the country-specific distribution of socio-economic status (both within and across schools) in the analysis.[12]

In all OECD countries, there is a clear advantage in attending a school whose students are, on average, from more advantaged socio-economic backgrounds, as indicated by the school environmental effect. In over half of the OECD countries, the school environmental effect is substantially higher than that of the individual background. However, cross-country differences are striking. Some countries show substantial inequalities associated with attending different schools: this is, for instance, the case in Germany or the Netherlands, where moving a student from a below-average school environment to an above-average one raises test scores by, respectively, 77 and 76 points, while the same move in Finland and Norway raises test scores by 4 and 10 points, respectively. These cross-country patterns are in line with existing evidence, in particular when comparing comprehensive school systems (*e.g.* Nordic countries) and non-comprehensive systems (*e.g.* Austria and Germany) (OECD, 2007a; Fuchs and Wossmann, 2004; Entorf and Lauk, 2006).[13]

Figure 7. **Effects of individual background and school socio-economic environment on students' secondary achievement**[1]

Socio-economic gradient taking cross-country distributional differences into account

Differences in performance on the PISA science scale associated with the difference between the highest and the lowest quartiles of the country-specific distribution of the PISA index of economic, social and cultural status

Notes: The individual background effect is defined as the difference in performance on the PISA science scale associated with the difference between the highest and the lowest quartiles of the average individual background effects distribution of the PISA index of economic, social and cultural status, calculated at the student-level. The school environment effect is defined as the difference in performance on the PISA science scale associated with the difference between the highest and the lowest quartiles of the country-specific school-level average distribution of the PISA index of economic, social and cultural status, calculated at the student-level.

Data in brackets are values of the difference between the highest and the lowest quartiles of the country-specific school-level average distribution of the PISA index of economic, social and cultural status, calculated at the student-level.

The negative school environment effect for Iceland is not statistically significant.

1. Regression of students' science performance on students' family socio-economic background (as measured by PISA ESCS), and school-level socio-economic background (average PISA ESCS across students in the same school, excluding the individual student for whom the regression is run). Country-by-country least-squares regressions weighted by students' sampling probability. Robust standard errors adjusted for clustering at the school level. Regressions for Italy include regional fixed effects.

Source: OECD calculations based on the 2006 *OECD PISA Database.*

3.2.3. *Intergenerational persistence in post-secondary education achievement*

Parental background can also influence post-secondary educational achievement of their offspring, although cross-country comparable evidence is rather sparse (Box 6). Here, this issue has been investigated empirically by estimating the percentage increase (decrease) in the probability of achieving a certain level of education given parents' education based on comparable data for European OECD countries (Box 4 and Causa *et al.,* 2009, for details). This gives an indication of the extent to which the offspring's education level reflects that of their parents, and can be taken as a measure of intergenerational persistence in education.

Across all European OECD countries covered by the analysis, there is a positive estimated probability premium of achieving tertiary education associated with coming from a higher-educated family, while there is a probability penalty associated with growing up in a less-educated family (Figure 9). For pairs of fathers and sons, the estimated premium is particularly large in Luxembourg and Italy, and also in Finland and Denmark, where the probability of achieving tertiary education is almost 30 percentage points higher

Box 6. **Post-secondary education mobility in selected OECD countries**

For the adult population, the internationally comparable evidence of educational persistence across generations is sparser than that of income persistence and the evidence of educational persistence for teenagers. Intergenerational educational persistence can be estimated either based on the number of years of formal education, or on qualification or literacy levels achieved.

Using data for a large number of countries, Chevalier *et al.* (2007) measure educational persistence based on adult literacy levels according to the International Adult Literacy Survey (IALS). They find persistence in education over generations across a wide set of developing and developed countries. The ranking of countries varies depending on the mobility measure employed. Overall, persistence is found to be high in Germany, Poland, Switzerland and the United Kingdom and lower in the Nordic countries, Belgium and the United States.[*] Furthermore, the intergenerational link in education is estimated to be marginally weaker for women than for men. In general, educational mobility is estimated to have increased over time.

A recent empirical study by Hertz *et al.* (2007) estimates educational mobility across generations using years of schooling for a number of countries. Again, there is persistence in education across generations for all countries (Figure 8). The correlation between parents' and their offspring's years of schooling is particularly high in Italy, Slovenia, Hungary, the United States, Switzerland and Ireland, while it is much lower in most Nordic countries (except Sweden) and the Netherlands. On average, the correlation between years of schooling for parents and their offspring is 0.39 for the countries surveyed, ranging from 0.54 in Italy to 0.30 in Denmark.

Figure 8. **Intergenerational persistence in years of schooling[1]**
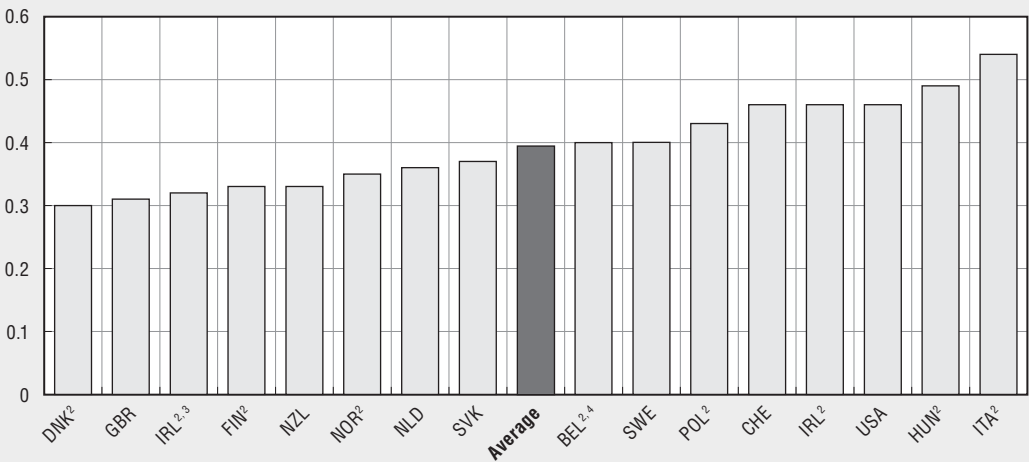
1. Correlation between parents and children's years of schooling. The correlation is the intergenerational education elasticity adjusted for the ratio of the standard deviations in years of schooling of parents and children. Data refers to men and women, aged 20-69.
2. Ages 20 to 64 or 65 only; nine cohorts.
3. Northern Ireland.
4. Belgium (Flanders).

Source: Hertz *et al.* (2007).

[*] This ranking is based on the eigen value mobility measure reported in Hertz *et al.* (2007).

Figure 9. **Probability premium and penalty of achieving tertiary education due to father's education levels:[1] Selected European OECD countries**
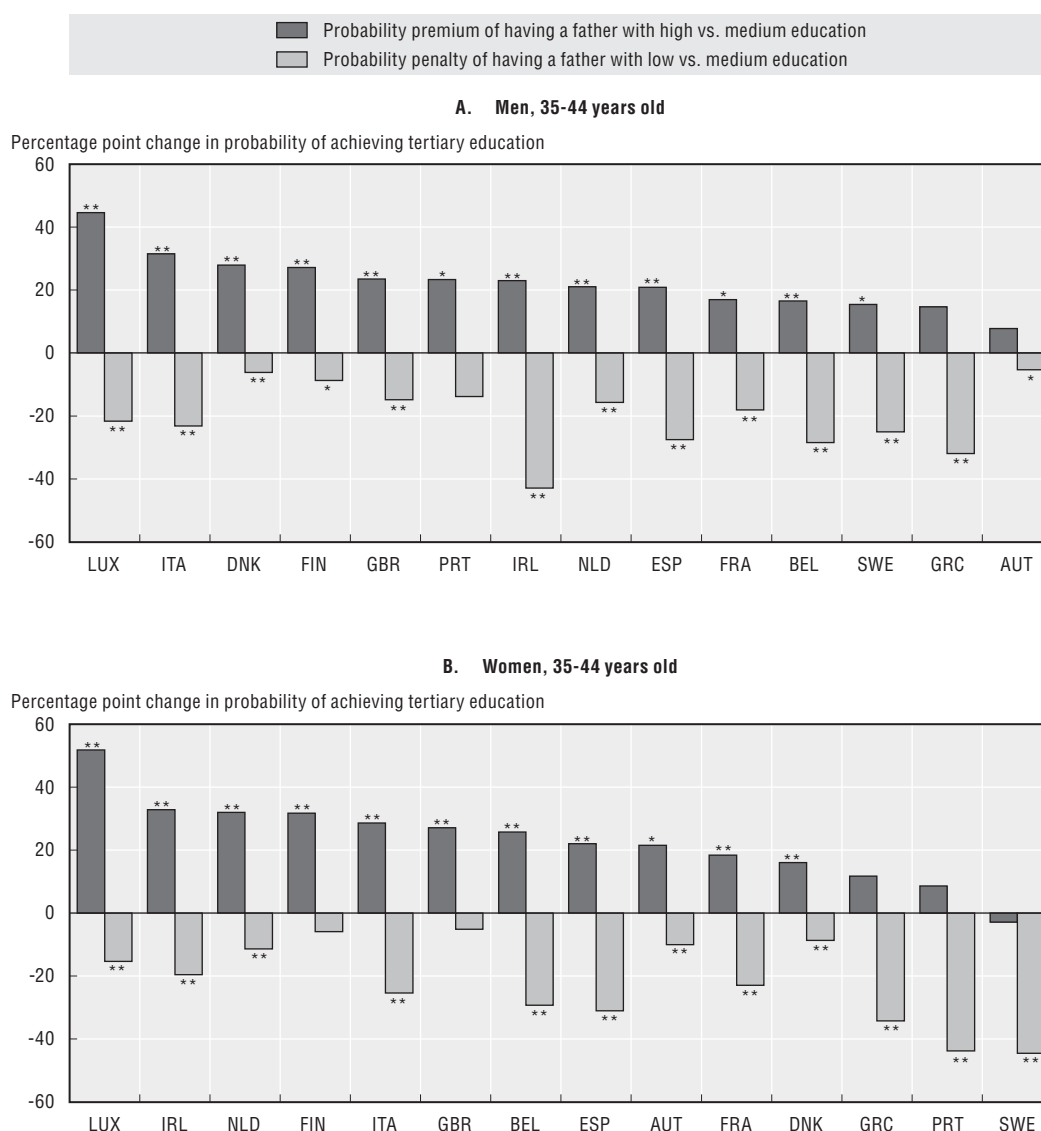
Probability premium of having a father with high vs. medium education
Probability penalty of having a father with low vs. medium education

A. **Men, 35-44 years old**

Percentage point change in probability of achieving tertiary education

B. **Women, 35-44 years old**

Percentage point change in probability of achieving tertiary education

Notes: * denotes statistically significant at 10% at least.
** denotes statistically significant at 5% at least.
Based on ordered probit estimation of individuals' educational attainment, conditional on urbanisation of the living area, migration status, marital status, number of siblings and family status when the individual was a teenager. Marginal fixed effects reported.
Germany is not included in this figure, as there is a problem with the representativeness of the German sample along the education dimension.

1. The figure shows the estimated percentage point change in the probability of an offspring to achieve tertiary education depending on the offspring's parental background. The probability premium is the increase in the probability of an offspring to achieve tertiary education given that his/her father had achieved tertiary education relative to an offspring whose father had upper-secondary education. The probability penalty is the decrease in the probability of an offspring to achieve tertiary education given that his/her father had achieved below upper-secondary education relative to an offspring whose father had upper-secondary education.

Source: OECD calculations based on the 2005 *EU-SILC Database*.

for a son whose father had tertiary education, compared with a son whose father had only upper-secondary education. The estimated penalty of coming from a low-educated family is sizeable in Ireland and Greece.[14] The ranking of the probability premium for pairs of fathers and daughters is relatively similar to that of sons. However, there are some differences. Daughters' probability premium is significantly lower than that of sons in Denmark, while it is much higher in the Netherlands, Ireland, Belgium and Austria. The probability penalty for daughters associated with growing up in a low-educated family is higher than that for men in several countries, particular in Portugal and Sweden.

3.2.4. Summary measure of persistence in tertiary education

In the same way as with intergenerational wage persistence, the persistence in tertiary education can be summarised by measuring the gap between the probability premium and penalty to achieve tertiary education, as reported above. A larger gap implies that a father's education more strongly influences individuals' education and, therefore, indicates stronger persistence in tertiary education across generations. According to this measure, persistence is relatively high in Luxembourg, Ireland and in most southern European countries, while it is relatively low in Austria and Denmark (Figure 10), in line with previous comparative studies (*e.g.* Hertz *et al.,* 2007, and Box 6).

Figure 10. **Summary measure of persistence in tertiary education:[1] Selected European OECD countries**
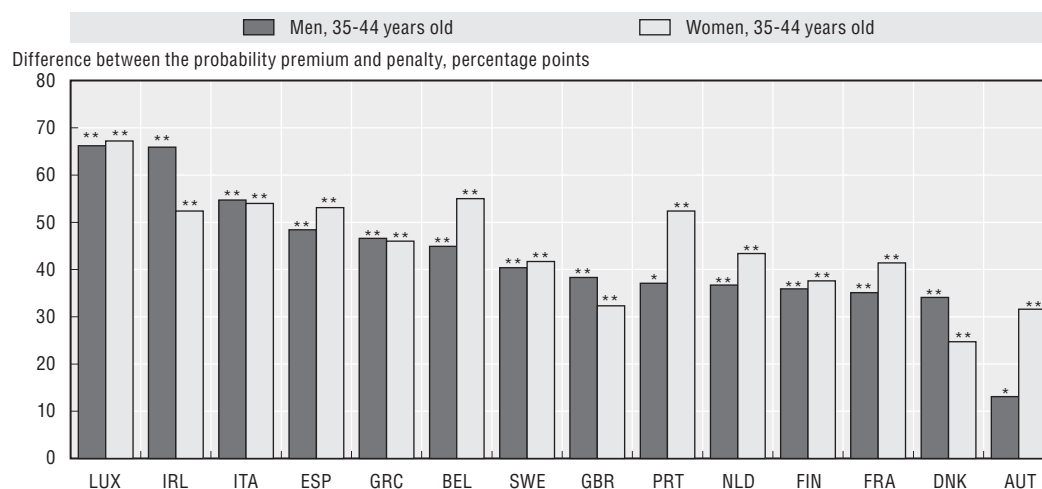
Notes: * denotes statistically significant at 10% at least.
** denotes statistically significant at 5% at least.
Germany is not included in this figure, as there is a problem with the representativeness of the German sample along the education dimension.

1. Persistence in tertiary education is measured as the distance between the estimated probability premium and penalty. Thus, it measures the percentage point increase in the probability of an offspring having a father with tertiary education to achieve tertiary education relative to an offspring having a father with below-upper secondary education. A larger number implies a larger gap, thus stronger persistence in tertiary education or a higher degree of educational immobility across generations. Based on ordered probit estimation of individuals' educational attainment. Marginal fixed effects reported.

Source: OECD calculations based on the 2005 *EU-SILC Database*.

3.2.5. *Intergenerational persistence in below upper-secondary education achievement*

In all European OECD countries covered by the analysis, there is an estimated increase in the probability of achieving below upper-secondary education ("a probability penalty") for a son or daughter whose father had achieved below upper-secondary education compared with one whose father had achieved upper-secondary education (see Causa *et al.*, 2009, for details). This probability penalty amounts on average to 18 percentage points. Likewise, in most countries there is an estimated decrease in the probability ("a probability premium"), on average 10 percentage points, for an offspring to achieve below upper-secondary education if their father had achieved tertiary education compared with one whose father had achieved upper-secondary education. Persistence in below-upper secondary education is summarised by the difference in the probability of achieving below-upper secondary education, depending on paternal education attainment, where a larger difference implies stronger persistence (Figure 11). According to this metric, persistence in below-upper secondary education is relatively strong in certain southern European countries, Ireland and Luxembourg, while it is lower in Austria, some Nordic countries, France and the United Kingdom.

Figure 11. **Summary measure of persistence in below-upper secondary education:**[1] **Selected European OECD countries**

Notes: * denotes statistically significant at 10% at least.
** denotes statistically significant at 5% at least.
Germany is not included in this figure as there is a problem with the representativeness of the German sample along the education dimension.
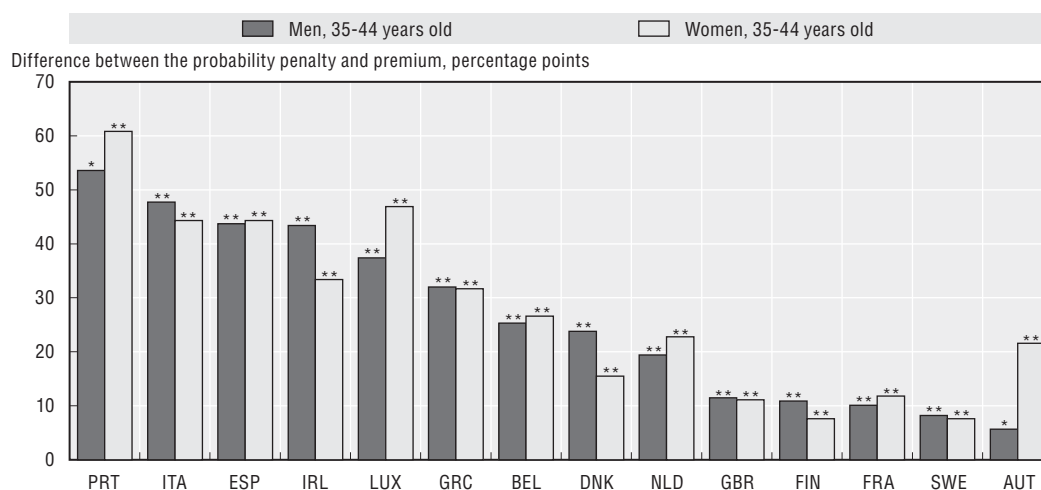1. Persistence in below upper-secondary education is measured as the distance between the estimated probability penalty and premium. Thus, it measures the percentage increase in the probability of an offspring having a father with below upper-secondary education to achieve below upper-secondary education relative to an offspring having a father with tertiary education. A larger number implies a larger gap, thus stronger persistence in below upper-secondary education or a higher degree of immobility across generations. Based on ordered probit estimation of individuals' educational attainment. Marginal fixed effects reported.
Source: OECD calculations based on the 2005 *EU-SILC Database*.

3.3. Intergenerational social mobility in OECD countries: some concluding remarks

In this study, intergenerational social mobility is measured by several different indicators, since no single indicator provides a complete picture of social mobility. One pattern that emerges is a group of countries that appears relatively immobile on most indicators (*e.g.* southern European countries and Luxembourg) and another group that tends to be relatively mobile (*e.g.* Nordic countries). However, these indicators do not necessarily provide the same picture of persistence across countries. For instance, the United Kingdom seems to be less mobile in terms of wage persistence (measured by the summary indicator of wage persistence) than in terms of education persistence (measured by the summary indicators of tertiary and below upper-secondary education persistence), while the reverse is the case in Ireland. In some other cases there appears to be a relatively large premium in achieving tertiary education associated with growing up in a well-educated family at the same time as the penalty of growing up in a less-advantaged family is fairly low (*e.g.* Denmark and Finland), whilst the reverse is true in some other countries (*e.g.* Sweden and Greece). Differences in cross-country rankings of persistence also emerge when comparing the measure of secondary education persistence (*i.e.* the influence of socio-economic background on students' PISA score) with education persistence measures. For example, in France persistence appears to be much stronger on the former than on the latter measures.[15]
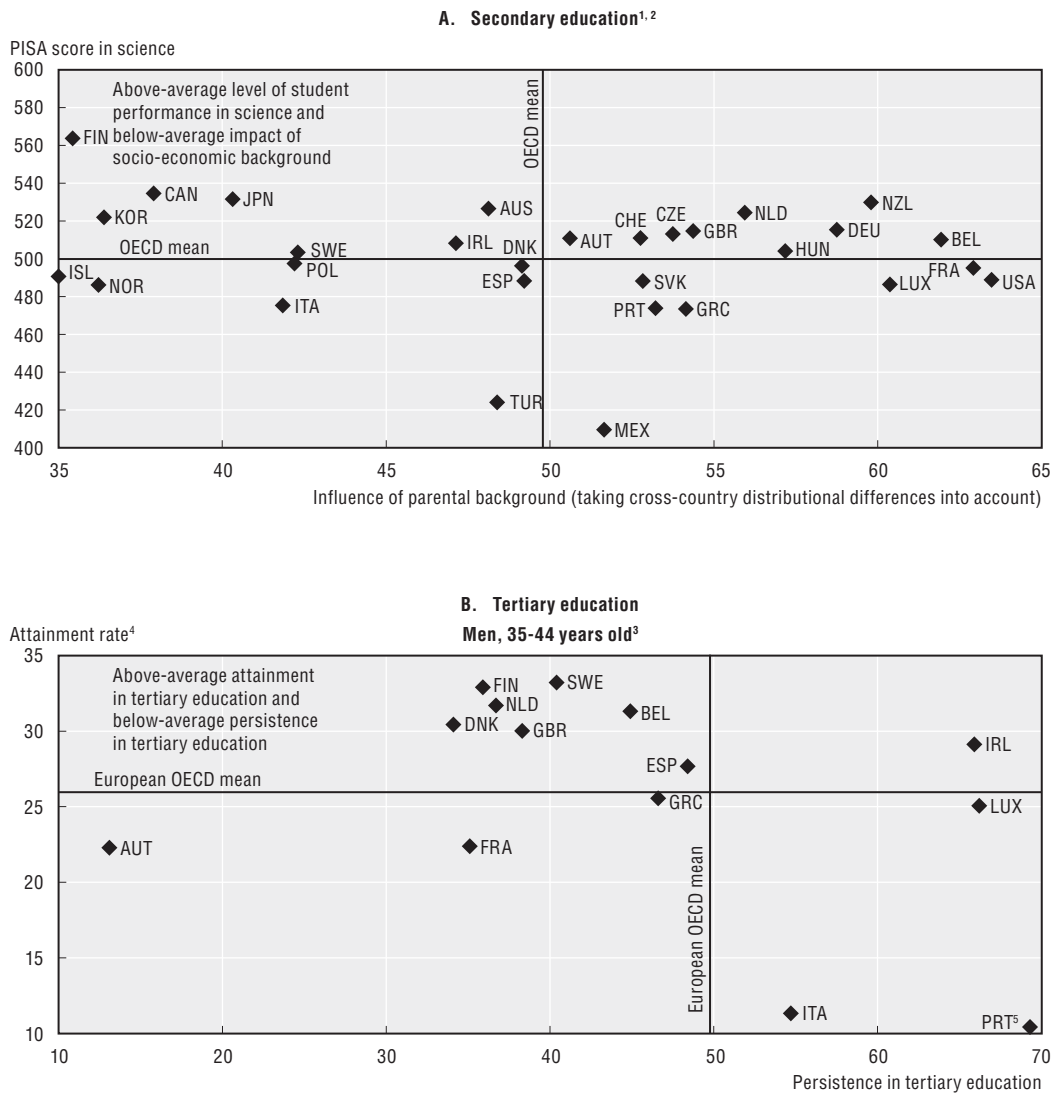
3.3.1. Performance and equity in education

Even though family background influences offspring secondary and post-secondary educational achievement in all OECD countries, albeit to a varying degree, some countries have relatively low persistence in education *and* relatively high average schooling performance (OECD, 2007a). In Finland, Canada, Korea and Japan, students attending secondary education perform above OECD average on PISA scores, while the influence of socio-economic background is below OECD average (Figure 12, panel A). Likewise, in Finland, Sweden and Denmark, persistence in tertiary education over generations is relatively low, whereas attainment levels are fairly high (Figure 12, panel B). This may reflect cross-country differences in public policies, suggesting policies partly offset the effect of family background on educational outcomes.

3.3.2. Low mobility in education could translate into inequalities in wages

Obstacles to social mobility may accumulate, making the achievement of upward wage mobility particularly hard for the offspring of disadvantaged families. Inequalities at one stage of life translate into inequalities at later stages. Since learning is an ongoing process and skills acquired at one stage raise productivity and cognitive development in the next stage (*e.g.* Cuhna *et al.,* 2006), inequalities that arise in secondary education are likely to translate into inequalities in higher education. For instance, a recent OECD study showed that in Canada top performing students according to PISA scores were much more likely to attend university than their lower performing peers (OECD, 2010). In turn, such advantages could translate into inequalities in wages via returns to education in the labour market, or possibly through employability.

Figure 12. **Performance and equity in education**

A. Secondary education[1,2]

PISA score in science

Above-average level of student performance in science and FIN below-average impact of socio-economic background

OECD mean

Influence of parental background (taking cross-country distributional differences into account)

B. Tertiary education
Men, 35-44 years old[3]

Attainment rate[4]

Above-average attainment in tertiary education and below-average persistence in tertiary education

European OECD mean

Persistence in tertiary education

1. Regression of students' science performance on students' PISA index of economic, social and cultural status (ESCS). Country-by-country least-squares regressions weighted by students' sampling probability. Robust standard errors adjusted for clustering at the school level.
2. Socio-economic gradient, taking cross-country distributional differences into account: effect of students' socio-economic background on student performance in science, defined as the difference in performance on the PISA science scale associated with the difference between the 75th and the 25th quartiles of the country-specific distribution of the student PISA index of economic, social and cultural status.
3. Persistence in tertiary education is measured as the distance between the estimated probability premium and penalty in achieving tertiary education. It measures the percentage point increase in achieving tertiary education of a child whose father had achieved tertiary education relative to a child whose father had below upper-secondary education. A larger number imply a larger gap, thus stronger persistence in education.
4. The attainment rate is defined as the percentage of 35-45 year old men in the population that has attained tertiary education according to *OECD Education at a Glance Database*.
5. 25-34 years old for persistence in tertiary education in Portugal.

Sources: OECD calculations based on the 2006 *OECD PISA Database* and on the 2005 *EU-SILC Database*, *OECD Education at a Glance Database*.

4. Inequality, intergenerational social mobility and growth: the role of policies

4.1. Mobility and growth

Intergenerational social mobility may have positive effects on economic growth through the allocation of talents and abilities in the economy. Lacking such mobility, potential misallocation of talents and skills may lead to inefficiencies, with negative consequences for growth (*e.g.* Galor and Tsiddon, 1997; Murphy *et al.,* 1991, and Box 7). Thus, public policies aimed at removing obstacles to intergenerational social mobility may improve the allocation of resources, thereby increasing growth. The reverse is also possible,


Box 7. **The potential effect of social mobility on growth**

A simple numerical example can illustrate the potential impact of increasing social mobility on growth. Given the simplifying assumptions underlying the calculation, this example should be seen as purely speculative. Consider intergenerational education persistence and assume that the average relation between parent and offspring years of schooling in OECD countries (expressed in differences from average years of schooling among OECD countries) is:

Offspring years of schooling = γ* Parent years of schooling.

The average years of schooling are 12.2 years and the average relationship between offspring and parent years of schooling, γ, is 0.39 (Hertz *et al.*, 2007). Now, consider a country in which years of schooling fall short of the OECD average, at the same time as persistence in years of schooling is above OECD average (Figure 13). For example, consider Italy with average years of schooling of 10.1 years and average persistence in years of schooling of 0.54. In this country, 1.16 years [*i.e.* 0.54*(10.1 – 12.2)] of the shortfall could potentially be passed on to offspring from parents. Reducing persistence in schooling to the OECD average of 0.39 would reduce this shortfall that could be passed on to the next generation to 0.85 [0.39*(10.1 – 12.2)]. Thus, reducing intergenerational persistence in schooling to the OECD average would reduce from 1.16 to 0.85 the shortfall in years of schooling (relative to the OECD average) that could potentially be passed on from one generation to another.

Figure 13. **Intergenerational persistence and average number of years of schooling**[1]
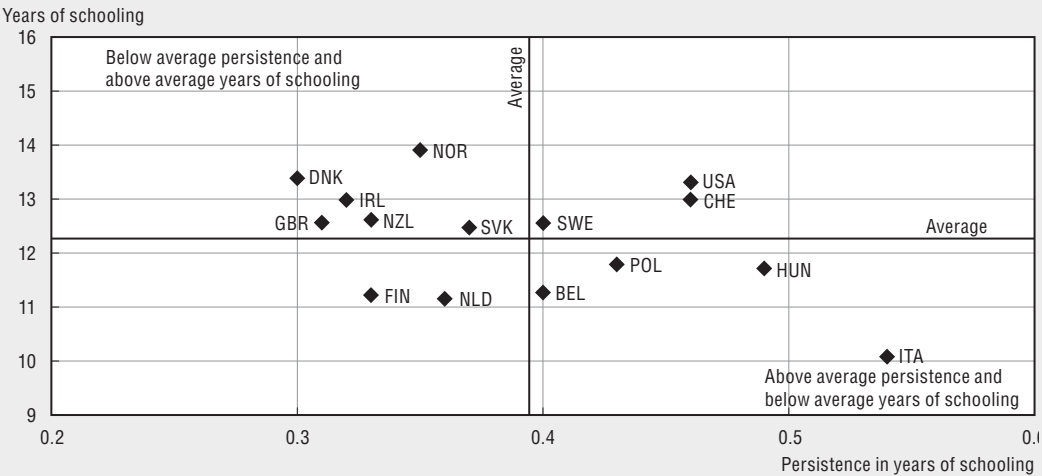
1. Persistence refers to the correlation between parents and children's years of schooling. The correlation is the intergenerational education elasticity adjusted for the ratio of the standard deviations in years of schooling of parents and children. Data refers to men and women, aged 20-69.

Sources: Hertz *et al.* (2001) and *Education at a Glance,* 2006.

Box 7. **The potential effect of social mobility on growth** (*cont.*)

The effect on long-run GDP per capita of a decrease in educational persistence, resulting in an increase in average years of schooling, depends on the influence of additional years of schooling on GDP as well as on how much of the original shortfall in schooling is explained by the offsprings being constrained by their background. Recent OECD estimates suggest that one additional year of schooling would increase the long-run level of GDP per capita by between 4 to 7% (OECD, 2003). To the extent that the short-fall is entirely due to the fact that in Italy the offspring are constrained by their background, the potential increase in years of schooling from reducing persistence would translate into a 1.3 to 2.2% (*i.e.* 0.31*4 and 0.31*7) increase in long-run GDP per capita (see Table 1 below). However, if the shortfall is only partly explained by parental background, then the range of GDP per capita gains from decreasing persistence would be smaller. The numbers obtained in this example need to be interpreted with caution as a number of caveats apply to this exercise. It is likely that the misallocation of human resources is not fully captured by the link between parents and their offspring education. Further, persistence in education may not be measured properly by the relation between parents and offspring years of schooling.

Table 1. **The effect of increased mobility on long-run growth**

Per cent

	Short-fall in schooling explained fully by background	Short-fall in schooling explained half by background	Short-fall in schooling explained one-fifth by background
High influence of education on long-run GDP (7%)	2.2	1.1	0.4
Moderate influence of education on long-run GDP (5.5%)	1.7	0.9	0.3
Low influence of education on long-run GDP (4%)	1.3	0.6	0.2

Source: OECD calculations.

with faster economic growth generating more opportunities and enhancing intergenerational social mobility if these opportunities disproportionately benefit the disadvantaged. For instance, in periods of major technological progress, the relative importance of individual ability relative to parental background to understand and take advantage of available economic opportunities may increase. This enhances mobility and generates a higher concentration of high-ability, better-educated individuals in technologically advanced sectors, which in turn stimulates growth (Galor and Tsiddon, 1997).[16]

4.2. Mobility and inequality

An important channel through which public policies could influence intergenerational social mobility is by affecting intra-generational inequality. The distribution of cross-sectional household income is strongly influenced by the distribution of wages (*e.g.* Galbraith and Kum, 2005; Gottshalk and Danziger, 2005), which in turn reflects differences in returns to education. Differences in wage distribution across countries also reflect labour supply and demand factors, as well as the institutional environment (*e.g.* Blau and Kahn, 1996, 2003; Acemoglu, 2003; OECD, 2002). Across OECD countries, wage dispersion is lower in countries where institutions compress the distribution of wages (*e.g.* the Nordic countries). However, recent OECD evidence shows that such institutions

also tend to reduce employment among older workers (*e.g.* Bassanini and Duval, 2006) and thus reduce the overall share of wage-earners in the economy. In turn, this increases cross-sectional income inequality across the entire population.[17]

However, the relationship between cross-country income and/or wage inequality and intergenerational income persistence is not straightforward, as various factors are at work, sometimes in opposite directions. On the one hand, countries with a wide distribution of income are also likely to be those where the returns to education are relatively high. As discussed above, if parental background or income affects access to and/or investment in education through credit or other constraints, then the ability to take advantage of the high returns from education is limited to the offspring of relatively advantaged parents (Corak, 2006; Solon, 2004, d'Addio, 2007). Therefore, when inequalities between parents increase, intergenerational mobility falls because it is easier for advantaged parents to buy their children educational advantages that disadvantaged parents cannot afford (Burtless and Jencks, 2003).[18] On the other hand, inequality could increase intergenerational mobility by enhancing incentives to undertake effort (*e.g.* Lazear and Rosen, 1981) by working longer hours or by strengthening incentives to undertake education, which could result in more investment in education if financial markets are sufficiently developed.[19] With returns to education likely to be higher in more unequal societies, and with incentives to acquire additional education stronger in countries where the "pay-off" from doing so is relatively larger, social mobility could be higher in countries where income or wage dispersion is higher.

### 4.2.1. *Positive association between intergenerational income persistence and inequality*

While theory and evidence are mixed, some studies suggest that higher cross-sectional inequality tends to be associated with lower mobility (Björklund and Jäntti, 1997; Solon, 2004; Andrews and Leigh, 2009; Corak, 2006; d'Addio, 2007). Indeed, the association between cross-sectional inequality (measured by the Gini coefficient of household disposable income) and the persistence in wages across generations measured by the estimated wage gap between individuals coming from different family backgrounds is positive in European OECD countries covered by the analysis (Figure 14). OECD estimates also show that a higher degree of inequality is associated with a greater influence of individual socio-economic background on student cognitive achievement in secondary education in a larger set of OECD countries (Causa and Chapuis, 2009).

Similarly, there is a positive association across European OECD countries between intergenerational persistence in wages and poverty rates (based on a measure of household disposable income), although weaker than the association between persistence and inequality (see Causa *et al.,* 2009). Again, this link is recorded for OECD countries at the level of teenagers' cognitive skills. More specifically, higher levels of child poverty (measured after taxes and transfers) and a greater lack of basic resources are associated with a stronger influence of parents' socio-economic background on their offspring's cognitive achievement.

4.3. *Mobility and policies*

Insofar as faster economic growth enhances social mobility, policies that have a positive effect on the drivers of growth (*e.g.* tax or labour-market reforms) could also increase social mobility across generations. Moreover, the direct effect of these policies on growth is likely to materialise quicker than any indirect effect through social mobility, since mobility largely influences growth by improving the allocation of human resources

Figure 14. **Correlation between inequality and intergenerational wage persistence (corrected for distributional differences):[1] Selected European OECD countries**

Men, 35-44 years old

Wage persistence, corrected for distributional differences (percentage point change in wages)
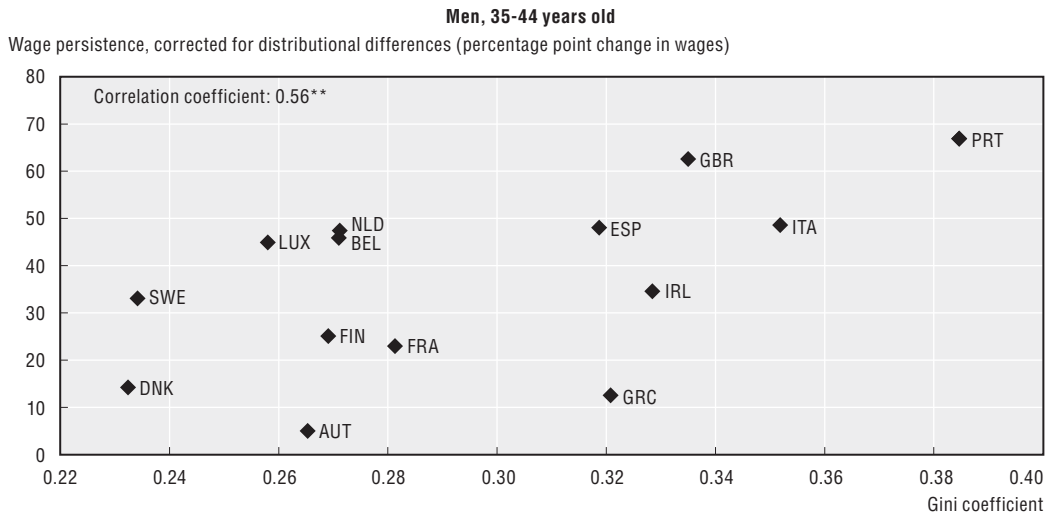
Notes: ** denotes significant at 5%.

Germany is not included in this figure, as there is a problem with the representativeness of the German sample along the education dimension.

1. Persistence in wages is measured as the distance between the estimated wage premium and penalty. Thus, it measures the percentage increase in wages of an offspring having a father with tertiary education relative to an offspring having a father with below upper-secondary education. A larger number implies a larger gap, thus stronger persistence in wages or a higher degree of immobility across generations. The wage premium (penalty), corrected for distributional differences, corresponds to the wage premium (penalty), multiplied by the ratio of the standard deviation of fathers' education to the standard deviation of sons' or daughters' gross hourly wage. Inequality is measured by the Gini coefficient of disposable household income adjusted for household size.

Sources: OECD calculations based on the 2005 *EU-SILC Database* and OECD 2008, *Growing unequal?*

over generations, which takes a long time to materialise. Thus, it is likely that any direct effect of a policy on drivers of growth outweighs the indirect effect via social mobility, at least in the short to medium term.

At the same time, some of the policies that are thought to positively affect social mobility by reducing inequality may also have adverse effects on drivers of growth (*i.e.* labour utilisation or productivity). Conversely, some policies that are thought to enhance the drivers of growth may have adverse effects on social mobility. In this situation, a prudent approach could be to implement policies that remove obstacles to intergenerational social mobility without any adverse side effects on economic growth. Furthermore, it may be desirable to accompany growth-oriented policies with measures to lower their potentially negative effect on social mobility (especially through inequality), both because it may be desirable in itself and because it may reduce potentially harmful side effects on growth.

Ultimately, both the effects on growth of policies encouraging social mobility and those on mobility of policies encouraging growth are an empirical issue. While assessing the former effects is beyond the scope of this study, the remainder of this section explores the role played by a range of public policies *vis-à-vis* social mobility, especially regarding inequality. The empirical strategy for analysing such role of policies in a cross-country context is described in Box 8 (with more details to be found in Causa and Chapuis, 2009, and Causa *et al.,* 2009).

Box 8. **The influence of policies on intergenerational social mobility**

This box provides a simplified and stylised description of the common empirical approach underlying the cross-country analyses of the role of policies for intergenerational social mobility, based on PISA data for teenagers' cognitive skills and EU-SILC data for wages. The approach is based on two cross-country variants of the country-level analyses described in Boxes 3 and 4 (for details see Causa and Chapuis, 2009 and Causa *et al.,* 2009):

$$O_{ic} = \alpha_1 + \lambda \cdot F_{ic} + \gamma_c \cdot X_{ic} + \delta \cdot P_c \cdot F_{ic} + \phi \cdot P_{c\cdot} + \psi \cdot Z_{c\cdot} + \varepsilon_{ic}, \qquad [1a]$$

$$O_{ic} = \alpha_1 + \lambda \cdot F_{ic} + \gamma_c \cdot X_{ic} + \delta \cdot P_c \cdot F_{ic} + \theta \cdot C_{c\cdot} + \varepsilon_{ic}, \qquad [1b]$$

where O_{ic} denotes outcomes (gross hourly wages and test score in PISA) of individual i in country c, F_{ic} denotes parental/family background (father's education or family socio-economic status), X_{ic} denotes individual characteristics, Z_c denotes country-level variable(s), P_c denotes country-level policy variables and C_c denotes country fixed effects. In these equations, individual characteristics display country-specific coefficients. Equations [1a] and [1b] describe country-specific models, in which only the impact of the variables F_{ic} is restricted to be equal across countries.

Equation [1a] allows estimating the direct impact of policies on individual's outcome, while equation [1b] includes country-fixed effects and thus cannot identify the direct influence of a policy on the dependent variable as policies do not vary within a country or across cohorts. In order to assess the impact of policies on persistence, the analysis focuses on the signs and the magnitude of the interaction coefficient δ. Indeed, the family background effect varies across policy settings as follows:

$$\frac{\partial O_{ic}}{\partial F_{ic}} = \hat{\lambda} + \hat{\delta} \cdot P_c, \qquad [1c]$$

where hats indicate estimated coefficients. A positive δ means that the influence of family background on outcomes increases ($\lambda + \delta > \lambda$) and a negative δ means that it decreases ($\lambda + \delta < \lambda$) with the policy indicator P_c.

Equation [1c] can also be used to calculate the family background effect associated with different levels of the policy indicator across OECD countries (*e.g.* minimum, mean or maximum), providing a tentative way to quantify the relative impact of policies on equality of opportunity.

Following this approach, Figures 15, Figure 16 and 17 provide illustrative examples of the quantitative impact of policies on persistence in secondary education and wages, by simulating family background effects under different policy settings corresponding to the observed variation of policies across the countries covered by estimations. Figure 15 shows that increasing enrolment in childcare from the lowest level in the OECD (2%) to the highest (62%) would bring down the influence of the school environment effect on student performance from 61 to 13 test points in the PISA score. Similarly, Figure 17 shows that raising the average unemployment benefits from the lowest to the highest level in the OECD would reduce the wage gap associated with different family backgrounds from 15 to 0.7 percentage points.

Box 8. **The influence of policies on intergenerational social mobility** *(cont.)*

Figure 15. **Effect of the school socio-economic environment on secondary education achievement under different policy settings:**[1, 2] **OECD countries**
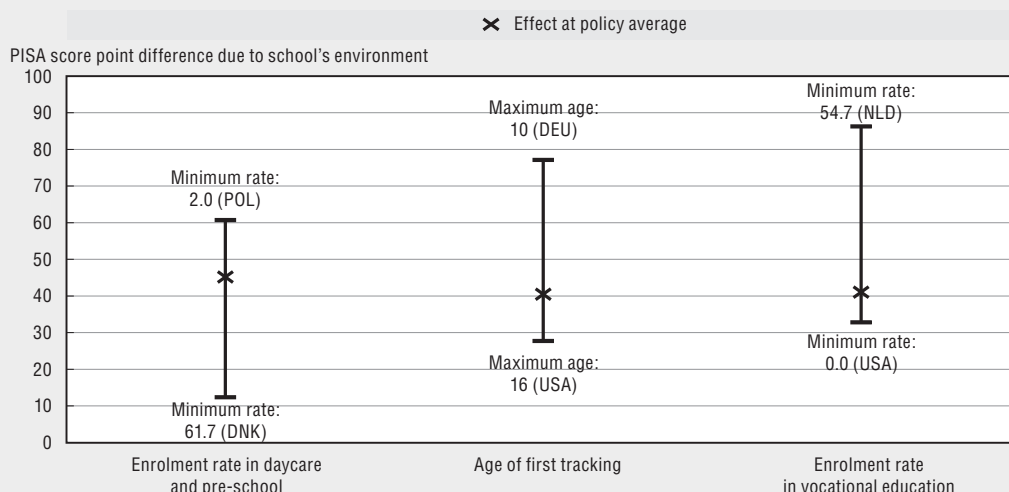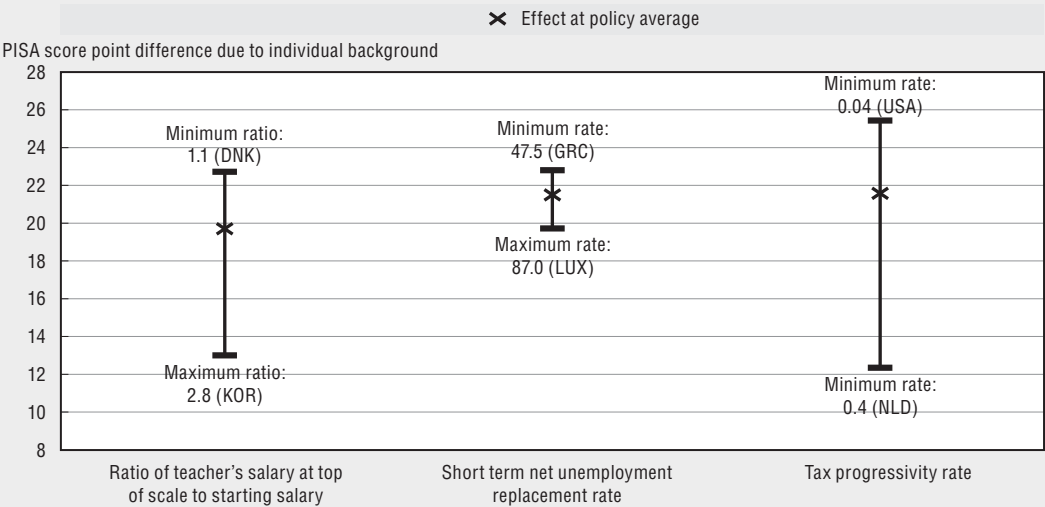

Note: Based on cross-country regressions presented in OECD Economics Department *Working Paper* No. 708, "Equity in Student Achievement across OECD Countries: An Investigation of the Role of Policies" by Orsetta Causa and Catherine Chapuis.

1. Each bar represents the change in the school environment effect associated with a change from the least to the most mobility-friendly level of the policy (based on OECD countries' policies distribution, excluding Mexico and Turkey).

2. Regression of students' science performance on student socio-economic background, individual control variables (gender, migration status and language spoken at home), school-level socio-economic background (average across students in the same school, excluding the individual student for whom the regression is run), school location (small town or village, city), school size and school size squared, school resources (index of quality of educational resources, index of teacher shortage, proportion of certified teachers, ratio of computers for instruction to school size), average class size, average student learning time at school and school type (private independent, private government dependent, public). Student ESCS and school-level ESCS are interacted with policy variables, entered one at a time. The regression includes country fixed effects. Country-specific parameters are used for all variables except student socio-economic background, school socio-economic background, and policy interactions. Cross-country least-squares regressions weighted by students' sampling probability, rescaled so that each country receives an equal weight, while taking country–specific sample representativeness into account.

Sources: OECD calculations based on *PISA 2006 Database*, various OECD and non-OECD sources.

Box 8. **The influence of policies on intergenerational social mobility** *(cont.)*

Figure 16. **Effect of individual parental background on secondary education achievement under different policy settings:**[1,2] **OECD countries**

PISA score point difference due to individual background

Minimum ratio: 1.1 (DNK)

Minimum rate: 47.5 (GRC)

Minimum rate: 0.04 (USA)

Maximum rate: 87.0 (LUX)

Maximum ratio: 2.8 (KOR)

Minimum rate: 0.4 (NLD)

Ratio of teacher's salary at top of scale to starting salary

Short term net unemployment replacement rate

Tax progressivity rate

Note: Based on cross-country regressions presented in OECD Economics Department *Working Paper* No. 708 "Equity in Student Achievement across OECD Countries: An Investigation of the Role of Policies" by Orsetta Causa and Catherine Chapuis.
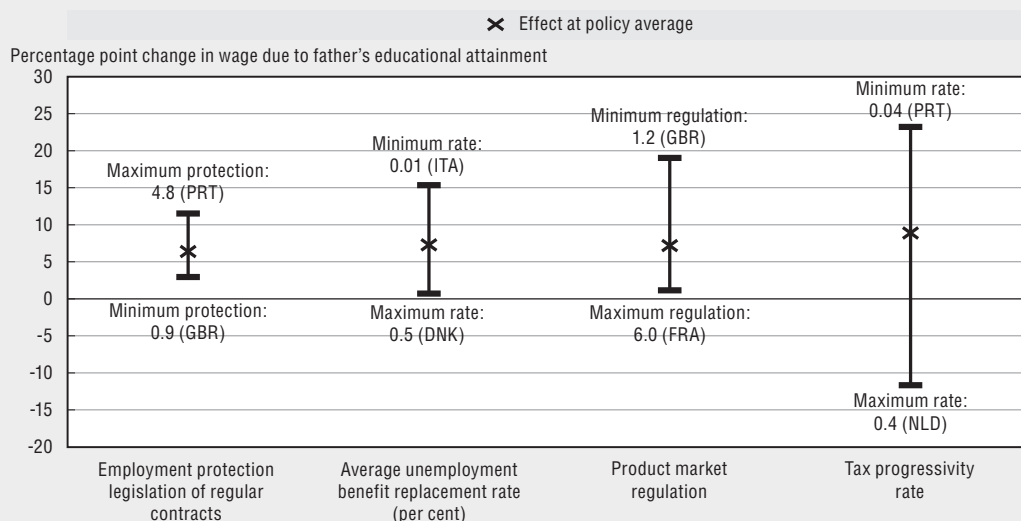
1. Each bar represents the change in the individual background effect associated with a change from the least to the most mobility-friendly level of the policy (based on OECD countries' policies distribution, excluding Mexico and Turkey).
2. Regression of students' science performance on student socio-economic background, individual control variables (gender, migration status and language spoken at home), school-level socio-economic background (average across students in the same school, excluding the individual student for whom the regression is run), school location (small town or village, city), school size and school size squared, school resources (index of quality of educational resources, index of teacher shortage, proportion of certified teachers, ratio of computers for instruction to school size), average class size, average student learning time at school and school type (private independent, private government dependent, public). The regression includes country fixed effects. Student socio-economic background (and school socio-economic background in the case of the Ratio of teachers's salary at top of scale to starting salary) are interacted with policy variables, entered one at a time. Country-specific parameters are used for all variables except student socio-economic background, school socio-economic background (in the case of the ratio of teachers's salary at top of scale to starting salary) and policy interactions. Cross-country least-squares regressions weighted by students' sampling probability, rescaled so that each country receives an equal weight, while taking country–specific sample representativeness into account.

Sources: OECD calculations based on *PISA 2006 Database*, various OECD and non-OECD sources.

Box 8. **The influence of policies on intergenerational social mobility** *(cont.)*

Figure 17. **Effect of father's educational attainment on his son's wage under different policy settings:**[1,2] **Selected European OECD countries**

Percentage point change in wage due to father's educational attainment

✗ Effect at policy average

Note: Based on cross-country regressions presented in OECD Economics Department *Working Paper* No. 709 "Intergenerational Social Mobility in European OECD Countries" by Orsetta Causa, Sophie Dantan and Åsa Johansson.

1. Each bar represents the change in the parental background effect (father's level of education) associated with a change from the least to the most mobility-friendly level of the policy (based on the European OECD countries' policies distribution).

2. Regression of men's hourly wages on father's level of education, own level of education, individual control variables (urbanisation of the area of residence, marital status, and migration background). The regression includes country-cohort fixed effects. The fathers' level of education is interacted with policy variables, entered one at a time. Country-cohort specific parameters are used for all variables except for father's level of education and policy interactions. Cross-country least-squares regressions weighted by individual sampling probability, rescaled so that each country receives an equal weight, while taking country-specific sample representativeness into account.

Sources: OECD calculations based on the 2005 *EU-SILC Database*, various OECD and non-OECD sources.

 These illustrative calculations have to be taken with great caution, given the empirical limitations associated with the underlying estimations. In particular, the finding of a significant correlation between the distribution of policies and the distribution of family background effects should not be interpreted in a causal way. Moreover, the impact of a particular policy might indeed capture the impact of another, correlated and omitted policy.[*]

[*] It is not possible to introduce several policies at the same time because multicollinearity makes it difficult to identify their respective impact.

4.4. *Early intervention policies*

 There is a growing recognition that access to early childhood education and care could provide young children, particularly from low-income and second-language groups, with a good start in life (Carneiro and Heckman, 2003; Machin, 2006; d'Addio, 2007; OECD, 2006a, 2007c). The provision of cost-effective and quality childhood education and care is on the government's agenda in many countries. Policies such as "Sure Start" in the United Kingdom and "Head Start" in the United States are designed to level the playing field at or near school-entry age for children from disadvantaged backgrounds. Existing evidence

concerning the impact of such programmes suggests that they have been successful in alleviating some of the initial gaps of children born in adverse family environments (*e.g.* Heckman, 2005; Currie and Blau, 2005; Brooks-Gunn, 2003; Sylva *et al.,* 2004; OECD, 2004). Cross-country regression results obtained in the context of this study suggest that enrolment in early childcare and education (day-care and pre-school) as well as spending on childcare and early education, are inversely related to the influence of family background on cognitive skills of teenagers (Figure 15 in Box 8 and Causa and Chapuis, 2009).

4.5. Educational policies and intergenerational social mobility

4.5.1. Education policies and school practices

Several empirical studies have documented a negative influence of early tracking policies on equality in educational achievement.[20] Systems that start grouping students early in their educational curricula tend to be associated with larger socio-economic inequalities, with no associated gains in average performance (OECD, 2007a). Results from cross-country regressions confirm these findings, suggesting that the influence of parental background on offspring performance at secondary school tends to be lower in countries where tracking takes place at a later stage and/or where ability grouping within schools occurs to a lesser extent (so called "comprehensive" systems), as compared with countries in which tracking and ability grouping occurs earlier (so called "non-comprehensive" systems). Regression estimates suggest that moving from a system that separates students into different schools at age ten (as is done in Germany and Austria) to a system that separates students at age sixteen (as is done in half of OECD countries) would reduce the effect of the school's socio-economic environment from 77 to 27 PISA score-points (Figure 15 in Box 8).[21]

Vocational education varies substantially across OECD countries in its design and implementation, as well as in its degree of success in equipping individuals with the skills needed in the labour market (*e.g.* Machin and Vignoles, 2005; Büchel, 2002). In many OECD countries, upper-secondary students can enrol in vocational programmes, while some countries delay vocational education (*e.g.* Canada and the United States).[22] Moreover, in some countries vocational training takes place mainly in schools and colleges (*e.g.* Nordic and Eastern European countries), while in other countries such training takes place mainly in the workplace through apprenticeships (*e.g.* Germany and Austria) or through a combination of school and workplace. These differences need to be kept in mind when evoking the concern that vocational education within secondary education ends up grouping "weak/disadvantaged" students into programmes that limit their future learning possibilities in a way similar to early tracking. Cross-country estimates suggest that there is a positive association between enrolment in vocational education and the influence of parental background on offspring secondary achievement (as measured by PISA scores). Vocational education at the secondary education level appears to exacerbate achievement differences associated with the school socio-economic environment without increasing overall performance.

4.5.2. Education policies and resources

The link between human capital and growth has been emphasized in the policy debate, and in many countries spending on education has increased since the mid-1990s. However, research on the relationship between educational spending and student performance is less encouraging. Most reviews reach the same conclusion: some measurable school inputs do matter for performance but the magnitude of their effects is

relatively small (Hanushek, 2003, for a review; Schütz *et al.,* 2005; OECD, 2007a). Cross-country regression estimates performed in the context of this study also suggest that increasing educational resources – either through raising spending or reducing class size-might not be the most effective tool for promoting equity in secondary education (see Causa and Chapuis, 2009).[23] By contrast, the ability to prioritise and allocate resources efficiently, measured by recently constructed OECD indicators capturing the "degree of decentralisation" and "degree of mechanisms matching resources to specific needs", seems to be negatively associated with the influence of parental background on offspring achievement in secondary education (see Sutherland and Price, 2007, for details of these indicators). This effect mainly derives from a weaker association between the school socio-economic environment and individual student performance.

The importance of teacher quality is rather well established (*e.g.* Hanushek, 2005, for an overview). New estimates undertaken for this study show a negative association between the proportion of qualified teachers and the influence of parental background on offspring achievement at secondary school. While raising teacher quality/skills might promote educational equity, little is known on how to translate this into effective policy. One frequent suggestion is to raise their salary levels, increase salaries in the most disadvantaged schools or areas, or introduce performance-based pay. Indeed, cross-country estimates suggest that the influence of family background on student achievement at secondary school is lower in countries where teacher wage profiles are steeper over their career. However, it should be recognised that such wage profiles may not capture performance-based pay systems, but rather constitute a proxy for cross-country differences in "seniority wage profiles".

4.5.3. *Loan systems and persistence in post-secondary education*

Evidence of credit constraints in undertaking tertiary education is rather limited and mostly concerns the United States. A few studies tend to suggest that credit constraints may not be the greatest obstacle to accessing higher education for disadvantaged students (Carneiro and Heckman, 2003; Dreaden *et al.,* 2004; Freynette, 2007; Wossman, 2008); rather it is the lack of adequate qualifications to be accepted into higher education, which points to the need for policies to intervene earlier (see above). By contrast, a recent study found evidence of the presence of credit constraints in post-secondary education in some European countries (Vandenberghe, 2007) and recent OECD work also found that lower financial constraints are associated with higher tertiary graduation rates (Oliveira Martins *et al.,* 2007). If financial constraints are present they are likely to be more important for able offspring from low-income backgrounds. In fact, cross-country empirical evidence shows that in a few European OECD countries (*e.g.* Belgium, France, Italy, Luxembourg, the Netherlands and the United Kingdom), financial constraints may hold back highly able individuals from disadvantaged backgrounds (see Causa *et al.,* 2009, for details).[24]

The design of tertiary educational loan systems and student support differs across OECD countries. Some countries apply universal/individual-based systems which consider higher education students as financially independent from their parents, whereas others use systems in which students are considered members of their families for the purpose of both financing and taxation. In general, in countries using other types of funding systems than the universal/individual systems, the penalty of having a lower-educated father for

achieving tertiary education is larger (Figure 18). There is suggestive evidence that universal government-supported loan systems can reduce liquidity constraints, thereby enhancing equality of access while maintaining incentives for swift and successful study completion (Oliveira Martins *et al.,* 2007).

Figure 18. **Funding system and access to tertiary education:**[1]
Selected European OECD countries
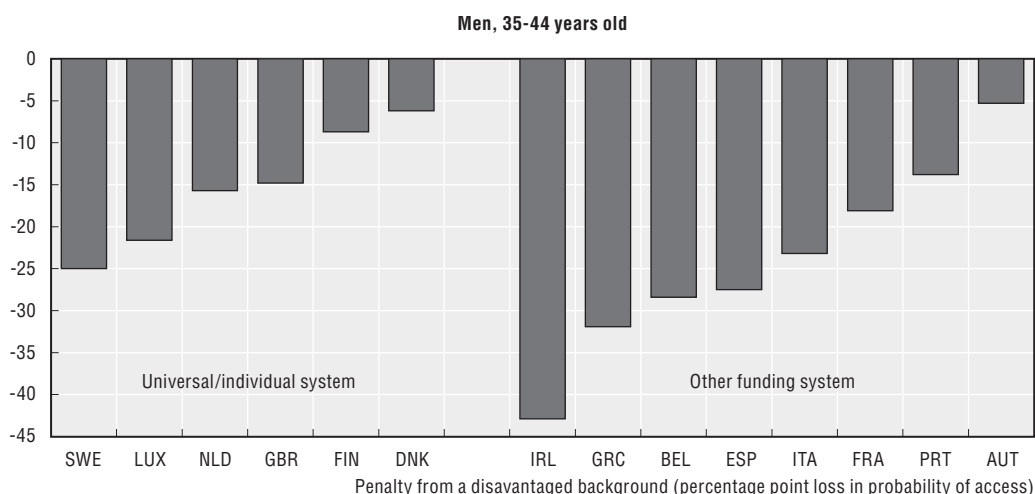
Men, 35-44 years old

Penalty from a disadvantaged background (percentage point loss in probability of access)

Note: Germany is not included in this figure as there is a problem with the representativeness of the German sample along the education dimension.

1. The figure shows the estimated percentage point decrease in the probability of a son to achieve tertiary education given that the son's father had achieved below upper-secondary education relative to a son whose father had upper-secondary education.

Sources: OECD calculations based on the 2005 *EU-SILC Database*, Oliveira *et al.,* 2007.

4.6. *Redistributive and income support policies*

Redistributive policies can alleviate financial constraints on disadvantaged families and allow them to invest in their children's human capital. Furthermore, social policies and redistributive taxes may narrow the gap between current incomes of parents, so that the incomes of their offspring could regress to the mean more quickly (Corak, 2006).[25] In this way, well-targeted redistributive policies could reduce not only current but also future inequalities. However, such policies may also lower incentives to undertake effort and invest in human capital as the net returns from these investments are reduced.

4.6.1. *Taxation*

One common measure of the redistributive nature of the tax system is the progressivity in the personal income tax schedule, which differs significantly across OECD countries and varies over time (Johansson *et al.,* 2007). This may reflect differences in social preferences, with strong progressivity in countries where emphasis is placed on a more even distribution of post-tax income and consumption. Cross-country estimates suggest that higher tax progressivity correlates across countries with a lower influence of parental background on their offspring's cognitive achievement in secondary education, as well as on their wages (Figures 16 and 17 in Box 8 of Causa and Chapuis, 2009; Causa *et al.*, 2009). To capture the possible effect of taxation on parents' ability to invest in their children's education, progressivity is measured at the time when the individual is a teenager. Thus,

one interpretation of the positive link with student performance and wages could be that redistributive policies allow less-advantaged parents to provide their children with a better environment, as well as with more time and resources for their education and upbringing (see below). This may facilitate learning at later stages in life, which could reduce inequality of opportunity in both higher education and wages. It is also possible that this finding reflects targeted tax cuts or tax credits (*e.g.* in-work benefits) to low-income households which, in turn, lowers the after-tax wage differential between low-income and higher-income households (*i.e.* reduces inequality).

4.6.2. *Unemployment benefits*

Short-term net unemployment benefits are found to be negatively associated with the influence of parental background on offspring achievement in secondary education (Figure 16 in Box 8 and Causa and Chapuis, 2009). The average unemployment benefit replacement ratio is also found to be negatively associated with intergenerational wage persistence across the European OECD countries (Figure 17 in Box 8 and Causa *et al.*, 2009). As above, unemployment benefits are measured at the time when the individual is a teenager. The policy implications of these findings are not clear, because existing empirical evidence also suggests that the presence of transfer income among parents is associated with lower wage prospects for their offspring (Corak, 2006). Moreover, some studies have found a considerable degree of intergenerational persistence in reliance on welfare, which could imply sustained cycles of welfare dependency (Page, 2004).[26] Therefore, income-support programmes are more likely to remove obstacles to intergenerational mobility if they are designed to encourage labour market participation and self-sufficiency across generations, while at the same time providing adequate income support during job search.

4.7. *Housing policy*

In some OECD countries housing-market outcomes encourage urban fragmentation along socio-economic lines, with a concentration of disadvantaged households in particular housing estates (OECD, 1998). Residential socio-economic segregation is often matched by schooling socio-economic segregation, primarily because a large share of students tends to go to schools in their own neighbourhood either for convenience or for regulatory reasons. As discussed above, the school environmental effect is sizeable in a number of OECD countries and tends to be larger in cities (see Causa and Chapuis, 2009). This leads to higher education and wage persistence across generations.[27] Thus, the design of housing and urban planning policies may play a role in removing obstacles to intergenerational social mobility. For example, in countries where there is a large contrast between private and social rental housing (so called "dualist rental system"), and the latter has a certain stigma, low-income households tend to cluster geographically (*e.g.* in the United Kingdom, Belgium, Japan, Australia and New Zealand), while in countries where private and social rental housing are integrated in one market (so called "unitary rental system"), segregation tends to be less pronounced (*e.g.* Sweden, Denmark and Austria; OECD, 2006b). Thus, policies aimed at increasing the social mix in neighbourhoods (for instance, by improving housing quality in deprived areas in order to attract middle-class families, OECD, 2006b) could be instrumental in improving social mobility, especially in countries where the influence of the school socio-economic environment on student performance is relatively large.

Cross-country regression results suggest that there could be potential equity and efficiency gains from increasing social mix in schools for a number of OECD countries (see Causa and Chapuis, 2009, for details). In countries suffering from high levels of school socio-economic differences, low-skilled or disadvantaged students would benefit more from interacting with more able or advantaged students, than the latter would lose from interacting with less able students. Estimates also show that in most OECD countries there is no adverse influence, and in some cases favourable effects, of the social mix on average student performance. These results are only suggestive, but they would indicate that there is no trade-off between social mix and overall performance. Hence, implementing measures aimed at reducing school socio-economic segregation through educational policies,[28] and also through housing policies, could help to promote social mobility without hampering, and perhaps even improving, educational efficiency.

Notes

1. Economists typically analyse income or wage/earnings mobility, while sociologists focus on mobility across social class and occupations (*e.g.* Erikson and Goldthorpe, 1992, for an overview of social class mobility). One advantage of measuring intergenerational mobility by class or occupation is that data restrictions are much less stringent, retrospective information of parent's occupation being more widely available than information about their incomes, wages or earnings. A disadvantage is that it is difficult to make international comparisons of social class and occupation since they may have very different meanings across countries.

2. There is ample evidence of sizeable returns to education, both to years of schooling and cognitive achievement (*e.g.* Card, 1999; Oliveira *et al.,* 2007). Furthermore, the returns to changes in qualitative measures of education, for example test scores on cognitive achievement, seem to be higher than those from additional years of schooling (Bishop, 1992; Riviera-Batiz, 1992).

3. The wage concept in this study refers to gross hourly wages and is based on new comparable micro data across European OECD countries, the *EU-SILC database*. Gross hourly wages are based on wages and salaries paid in cash for time worked in main and secondary jobs including holiday pay and additional payments during the year preceding the interview. Given the strong persistence in wages, this is a good proxy for current wages. An hourly rate is calculated by using the current number of hours the person works in his/her main job, including overtime. Admittedly, using hours worked in the main job may lead to an over-estimation of hourly wages for persons with two or more jobs. Moreover, only wage earners are covered. This may exaggerate the degree of intergenerational wage mobility to the extent that the offspring of higher-educated families are less likely to be inactive than the offspring of low-educated families.

4. There is very little evidence concerning the intergenerational income persistence for women across OECD countries. This neglect partly reflects that in economies where women's labour-force participation rates are lower than men's, their wages may be an unreliable indicator of their economic status. In the United States, income persistence for daughters is found to be somewhat weaker than for sons, but it is still rather substantial (Chadwick and Solon, 2002).

5. Across all European OECD countries covered by the analysis, there is substantial persistence in wages of pairs of fathers and daughters. This finding is robust to the use of mother's education instead of father's education.

6. Several studies have documented the existence of non-linearities in persistence; that is, the degree of persistence in wages across generations differs along the wage distribution (*e.g.* Jäntti *et al.,* 2006; Bratberg *et al.,* 2007; Corak and Heisz, 1999; Grawe, 2004). Such non-linearities are often explained by the fact that low-income parents face credit constraints in financing their children's education, and consequently such children's wages fall below that of non-constrained children with the same ability (*e.g.* Becker and Tomes, 1986; Becker, 1989). There seems to be some suggestive evidence of the existence of non-linearities in wage persistence across a number of European countries (see Causa *et al.,* 2009, for details).

7. Differences in immigration patterns across European OECD countries could influence the patterns in wage persistence. However, in most countries covered in this study the estimates of persistence

coefficients obtained, controlling for individual migration status, differ very little from those that omit this control, and the differences are statistically insignificant (see Causa *et al.,* 2009, for details).

8. There are much less comparable estimates of intergenerational persistence in wages or incomes for daughters.

9. On average across OECD countries, for each improvement of one international standard deviation in the family's socio-economic background, the student performance on the OECD PISA science scale improves by 40 points, ranging from 25 (Mexico) to 54 (France). This corresponds to a performance increase of 5% and 10%, respectively (based on an OECD average PISA performance of 500 points).

10. In Figure 7, for each country, the influence of parental background (the so-called "socio-economic gradient") is presented along with a "corrected" influence of parental background, defined as the increase in student performance associated with the move from the first to the last quartile of the country-specific distribution of student background.

11. More precisely, the school environment effect is defined as the difference in predicted PISA scores of two students with identical socio-economic backgrounds attending different schools (where the average background of students is separated by an amount equal to the inter quartile range of the country-specific school socio-economic distribution); the individual background effect is defined as the difference in predicted PISA scores of two students within a school (separated by the inter quartile range of the country-specific average within school socio-economic distribution).

12. This necessitates taking into account differences in the between and within school distribution of student socio-economic status. Hence, the comparison is made along two dimensions: both within and across countries. The approach differs from OECD (2007a) in that it is chosen to take cross-country differences in the distribution of socio-economic background into account, hence using country-specific distribution in the computations (Causa and Chapuis, 2009, for details).

13. Comprehensive school systems refer to those that do not systemically separate students according to ability or proficiency level; students follow a general unified curriculum across secondary schools.

14. For pairs of fathers and daughters, there is also a sizeable probability premium and penalty in achieving tertiary education. The cross-country pattern in the estimated probability premium for 35-44 year-old women is similar to that of men (see Causa *et al.,* 2009, for details).

15. Education persistence may be understated in France because the group of tertiary education fathers does not distinguish between having a father with a university degree and a father with a degree from a "*Grande École*". It is possible that the premium of having a father with a *Grande École* degree is higher than the premium of having a university-educated father.

16. But once existing technologies become more accessible, the importance of ability may decline and mobility may fall back to previous levels.

17. It is possible that institutions that impose wage floors (*e.g.* minimum wages or collective agreements) and compress wage distributions can in the long run force business to restructure their production, which may not necessarily lead to lower overall employment.

18. However, this effect will be mitigated to the extent that children from less-advantaged backgrounds disproportionately benefit from public spending on education (Solon, 2004).

19. In addition, higher wage differentials can also be productivity-enhancing. If wages are based on relative productivity, then workers with higher productivity (effort) will be rewarded with higher wages. This will increase equilibrium effort and lead to a positive relationship between wage dispersion and productivity. However, individual effort is reduced if wage differences are regarded as unfair (Akerlof and Yellen, 1990).

20. Both cross-country and country-specific studies have highlighted the negative impact of ability tracking on mobility (for cross-country evidence, see OECD, 2004, 2007a; Schütz *et al.,* 2005; Hanushek and Woessmann, 2005; Sutherland and Price, 2007; Duru-Bellat and Suchaut, 2005; Amermuller, 2005; for country-specific evidence, see *e.g.* Bauer and Riphahn, 2006; Pekkarinen *et al.,* 2006; Holmlund, 2006; and Bratberg *et al*., 2005).

21. A similar result is found for the number of school programmes available to 15-year-olds, which is another measure of early differentiation in secondary education (see Causa and Chapuis, 2009, for details).

22. On average, in the OECD, around 46% of upper-secondary students are enrolled in pre-vocational or vocational programmes (OECD, 2009).

23. This summary presentation of the results does not distinguish between heterogeneous tools (spending increases, class-size reductions) that are tested in the cross-country regressions (see Causa and Chapuis, 2009, for details). In particular, while spending is clearly a poor driver of educational equity, cross-country analysis shows that reductions in class size mitigate inequalities associated with schools' socio-economic differences (*i.e.* they reduce the school environment effect). However, the education literature emphasises the difficulty of properly identifying channels through which changes in class size have an impact on schools' contextual effects and the corresponding student outcomes, casting doubts on the effectiveness of reducing class sizes for equity purposes.

24. This finding is obtained by assessing the influence of parental background on their children's earnings at different quantiles of children's earnings distribution (so-called quantile regressions) (for details see Causa *et al.,* 2009). If financial constraints are present, the influence of parental background should be stronger in the upper quartile, since it is the more competent children from low-income families that are most likely to be financially constrained (Grawe, 2004).

25. This relies on two assumptions. First, an increase in income for parents has the same influence on their offspring regardless of its source, and second, the relationship between parent and offspring wages is linear and stable across the wage distribution.

26. A possible explanation of this phenomenon is that growing up in families that depend on welfare support reduces the stigma perceived by the offspring in getting his/her income from this source. Another possibility is that an individual living in a family receiving welfare support acquires information about the programme and its rules, thereby making it easier for her/him to collect it (Corak, 2006).

27. School environmental effects, and the so-called "neighbourhood effects", are interrelated social phenomena. In particular, school environmental effects may be one of the channels through which neighbourhood composition impacts individuals' behaviour and outcomes (*e.g.* Goux and Maurin, 2007).

28. School policies, such as school choice, can also be used as a tool to reduce residential and school segregation (see Causa and Chapuis, 2009). Cross-country research on this topic is scarce, mostly due to measurement issues. School competition may induce cream skimming, increase segregation and lead to adverse effects on disadvantaged students. However, specific experiences suggest that properly designed and equitable voucher systems can yield positive outcomes (*e.g.* the West and Peterson, 2006, study on voucher systems in Florida). Hoxby (2003) also suggests similar equity-enhancing effects of voucher and charter school programmes.

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