INTRODUCTION

To know a person’s education is to know a lot about them. It is informative about their occupation, their income, their health, their attitudes to a variety of topics, where they are likely to live and who they are likely to marry. It also provides information on their offspring’s outcomes regarding health, educational attainment, occupation and earnings. This chapter focuses on one of these outcomes: the intergenerational mobility in education.

There is a wealth of evidence on the positive relationship between parental education and their offspring’s education. This relationship is an important component of the process which gives rise to social stratification (Jencks et al., 1972) and intergenerational income mobility (see Chapter 11 of this volume). Also, this relationship is of interest in its own right since in the absence of good measures of permanent income, education can be seen as a good proxy and thus intergenerational educational mobility may offer a better picture of mobility. Moreover, a lack of educational mobility is an inefficient allocation of resources as individuals’ talents are not exploited. Hence, several policies target equality of access to education and take the form of releasing financial or information constraints, or positive discrimination. The mechanisms behind intergenerational educational mobility are important to disentangle as they have important consequences for the design of policies to improve educational opportunities (see, for example, Cunha et al. [2005] for an extensive review on when and how to intervene).

There are several mechanisms which contribute to the persistence of educational inequality between generations. They can be broadly divided into four categories: genetic, family background, economic and institutional. This chapter focuses exclusively on institutional effects and, more specifically, on the relationship between equality and mobility. The first difficulty comes
from the definition and measurement of these two concepts.\textsuperscript{4} For equality, the chosen measure here is equality of outcomes rather than of opportunities. The two concepts may be correlated but are clearly different. Specifically, perfect outcome-equality means that everyone has completed the same years of full-time education whilst perfect opportunity means that each individual achieves the level of education appropriate with his or her ability or preference in a levelled playing field (Roemer, 2000). The focus here is on equality of outcomes since that is what one observes, but we take the view that apart from extreme cases – such as random allocation – equality of opportunity will be positively correlated with equality of outcome.

Institutions clearly affect equality and mobility. Consider, for example, an education system where the state acts as ‘a benign dictator’ to impose homogeneity across the system such that the quality of education is comparable for all and independent of social background. In such a world, all children have identical opportunity and thus mobility should be high. Alternatively in a decentralized system, we can expect large differences in school quality so that children with richer parents will, \textit{ceteris paribus}, attend better institutions and achieve a higher level of education. We would then expect low mobility and large inequality. Thus, the general view is that equality of education and intergenerational mobility are positively related.

However, Checchi et al. (1999) show that the USA, which has a decentralized system, display more inequality than Italy but also more intergenerational educational mobility. Despite the effort of the state to level the playing field, Italian parental education is relatively more important for the success of children’s education. Checchi et al. (1999) explain that this paradox hinges on the labour market consequences of an egalitarian education system. If the education system is such as to compress the distribution of education, education is then less of a signal of ability which, in turn, reduces the financial return to education. This is strongly brought out by research on the marginal returns to schooling which shows that countries with more compressed earnings distributions, notably Scandinavian countries, have low rates of return (see Harmon et al. [2001] for a survey). Low returns to education then reduce mobility because for children of poorer families education is then a poor investment. Despite low returns, children from higher social class would nonetheless invest in education as a way to distinguish themselves, following Erikson and Goldthorpe’s theory (1992), and thus propagate intergenerational immobility. Alternatively, if returns are high, this creates incentives for poor but able pupils to take the risk to invest in their own education. There is, therefore, a sting in the tail of egalitarianism: too much egalitarianism leads to reduced intergenerational mobility. We refer to this approach as ‘the incentive trap theory’.
Intergenerational Educational Mobility

This argument, if true, has major implications for educational and social policy. Following Roemer (2000), state interventions should level the playing field between individuals with different characteristics or background but not compensate for differences in characteristics that are malleable by the individuals. Hence, more public funding may be attributed to the education of poorer individuals but not for differences in the effort level within a group. Levelling the playing field, for example, would suggest state intervention at primary and secondary levels to compensate for differences in parental investment and other circumstances independent of the child’s effort, but no affirmative action at tertiary level so as to preserve incentives to invest for all pupils.

While an in-depth analysis of two countries is useful one clearly cannot make a judgement of a general nature from two countries at a given period of time. This chapter builds on the finding of Checchi et al. (1999) but extends their analysis to all European participants of the 1995 International Adult Literacy Survey, to analyse the relationship between educational equality and intergenerational mobility. Moreover, we present some macro- and micro-based evidence, distinguish by gender and evaluate the stability of the relationship over time. Finally we provide some evidence that intergenerational mobility is correlated with certain characteristics of the education system.

2 REVIEW OF EVIDENCE

There is a wealth of evidence on the positive relationship between parental education and offspring’s outcomes (Haveman and Wolfe, 1995). The elasticity for intergenerational mobility in education ranges from 0.14 to 0.45 in the USA (Mulligan, 1999) and from 0.25 to 0.40 in the UK (Dearden et al., 1997). Cross-country comparisons have, in general, compared the impact of family background on educational achievement rather than measured intergenerational mobility in education. Woessmann (2004), for example, estimates the effect of the number of books at home (as a proxy for family background) on the test scores of students in the Third International Mathematics and Science Study (TIMSS) and uses this measure as an indicator of equality of opportunity. He reports no difference in equality of opportunity between Europe and the USA but large variation within Europe with France offering the highest equality of opportunity and the UK the lowest.

Comi (2003) uses the European Community Household Panel (ECHP) to test intergenerational mobility in education and earnings across Europe. Unfortunately the sample suffers from selection bias since only individuals
still living with their parents can be matched, and from poor measurement of earnings and education (only three categories). She reports low educational mobility in Mediterranean countries, France and Ireland but cannot identify whether or not the observed country differences in mobility stem from characteristics of the education systems. Surprisingly, given the results on income mobility, the UK is among the most mobile countries along with Austria, Denmark and the Netherlands.

To explain the intergenerational correlation in educational attainment, four main channels can be investigated. First, the intergenerational correlation in education may stem from genetic transmission. To separate nature and nurture effects, comparisons have been made between children of twin pairs with variation in schooling (Behrman and Rosenzweig, 2002) or between natural and adopted children (Björklund et al., 2006). These studies suggest that genetics alone cannot fully explain the correlation in education between generations. The origin of the nurture effect is still controversial. Second, concentrating on parental education, a series of recent studies have used changes in the minimum school leaving age laws as natural experiments affecting the education of parents independently of their own characteristics. For Norway, Black et al. (2005) estimate that parental education is mostly insignificant in determining a child’s education, whilst Chevalier (2004) and Oreopoulos et al. (2006) using, respectively, reforms to the minimum school leaving age in Britain and the USA, report positive effects. This could suggest that in countries with a more heterogeneous system, parental influence is greater.

Third, the influence of parental education on their children’s attainment could also stem directly from the financial returns to education. Policies relieving financial constraints such as Moving to Opportunity (in the USA) or Education Maintenance Allowance (in the UK) are associated with improvement in educational attainment. Krueger (2004) reviews various contributions supporting this view. Carneiro and Heckman (2003), on the other hand, argue that current parental income is unimportant in explaining educational decisions and that its effect is dwarfed by a permanent income effect or, more generally, family fixed effects. Meyer (1997) and Shea (2002) also find that unanticipated changes in long-term parental income have modest effects on the human capital of the children. Chevalier et al. (2005) also conclude that the impact of parental education is mostly through increased permanent income rather than a direct effect of parental education, and that income shocks when a teenager have limited impact.

This chapter focuses on the fourth and last strand of this literature which concerns institutional effects. There is an enormous, if inconclusive, literature on the effect of class size, teacher quality, peer effect or competition on scholastic achievement (see Chapter 3 of this volume), but more limited
evidence on how the organization of education impacts on intergenerational mobility. To analyse the effect of institutions, researchers have relied mostly on cross-country comparisons. Such an exercise is not without problems. Both Shavit and Blossfeld (1993) and Müller (1996) point out the difficulties in comparing qualifications between countries and across time since countries differ considerably in the historical development of their education systems and in the educational options available to the members of the cohorts studied when they were of school age.

In most countries there has been an expansion of the education system over time which could lead to a decline in the effect of a father’s education on that of his offspring (Ganzeboom and Treiman, 1993). However, Erikson and Goldthorpe (1992) note the importance of distinguishing between structural mobility and exchange mobility. The former relates to increased public investment in education and the later to how families exchange their relative positions in the educational distribution. For example, Blanden and Gregg (2004) report a greater impact of family background on the educational attainment for a cohort born in 1970 compared to the 1958 cohort in Britain, concomitant with a large increase in educational attainment especially at the tertiary level. The increased impact of family characteristics on educational choice is confirmed by Dearden et al. (2004) for the same cohorts, who report an increase in the proportion of pupils who are financially constrained (although from a small base: 2–3 per cent). Esping-Andersen (2004) notes that only in the Nordic countries did the effect of parental education decrease. The evolution of mobility and equality between cohorts is thus ambiguous.

Checchi (2006) presents several models of intergenerational mobility in education which vary in the quantity of information available to the parents regarding the ability of the child. Say that talent can take two values, $A$ (highly talented) and $B$ (low ability), and that the persistence in talent across generations ($\pi$) is independent of talent. School reveals the true value of talent at a cost ($C$) and increases the human capital of $A$-type individuals but has no effect on $B$-type ones. If the parent of a child was successful in school, then this parent is $A$-type and the expected ability of the child is thus

$$E(Talent) = \pi A + (1 - \pi) B.$$ (12.1)

Let’s define $W'$ and $W''$ as the wages obtained by, respectively, $A$-type and $B$-type individuals. An individual whose parent was educated will invest in his or her own education if

$$\pi AW' + (1 - \pi) BW'' - C > BW''.$$
Similarly, if the parent went to school and failed, then that parent is a B-type and the child will invest in his or her education if

\[(1 - \pi) AW^* + \pi BW^* - C > BW^* .\]

If \(\pi > 0.5\), individuals whose parents succeeded in education are more likely to invest in education, thus creating intergenerational correlation in educational attainment even if talent is not observed. However, if the child’s parent did not go to school, then the decision to go to school is based on the expected belief of being an A-type (\(\nu_t\) where the subscript \(t\) indicates the generation) so that

\[
u_t = \pi \nu_{t-1} + (1 - \pi)(1 - \nu_{t-1})
\]

\[
u_t = (1 - \pi) + (2\pi - 1)\nu_{t-1} .
\]

Hence, the beliefs about the child’s own ability are based on the parent’s belief about his or her own ability, and the child will only invest in his or her own education if

\[\nu_t W^* + (1 - \nu_t) W^* - C > W^* \Rightarrow \nu_t > C / (W^* - W^*) .\]

Lower costs of education and/or wider wage differentials between the educated and the non-educated workforce will increase the probability that individuals whose parents did not go to education invest in their own education.

This simple model highlights the importance of returns to education in the decision to invest in education for children whose parents have not gone to education. Accordingly, even when the costs to education are low – as in an equal opportunity system – children whose parents did not go to post-compulsory schooling may still have a low probability of investing in their education if the returns are not high enough.

3 MEASURING MOBILITY AND EQUALITY

The empirical evidence in this chapter is based on the International Adult Literacy Survey (IALS) which was administered by 21 governments between 1994 and 1998 to measure the literacy level of the adult population (OECD, 2000). We only keep European countries and, for purposes of comparison, the USA. As a measure of educational attainment we rely on the highest
qualification achieved, which is coded on a five-point scale based on the ISCED code. This measure is available in all countries for both generations with respondents reporting the education of their parents. We use data only on respondents aged between 25 and 65 who have completed their education and split them into two age groups. The younger category (aged between 25 and 44) represents between 52 and 65 per cent of the sample.9

As an initial measure of intergenerational mobility we report the rank correlation in education between the father’s and the respondent’s education. Figure 12.1 reports these correlations separately for the two cohorts. For the older generation the intergenerational correlation in education ranges from a low of 0.17 in Northern Ireland to a high of 0.50 in Belgium. The intergenerational correlation decreases for 11 countries and increases for the remaining seven. Overall, the correlation in educational attainment is reduced from 0.41 to 0.38 between cohorts. The largest change is observed for Finland which, for the younger generation, is the country with the lowest intergenerational correlation. Mobility is low in the Czech Republic, Germany, Italy and Slovenia. These measures of intergenerational mobility are rather crude and more elaborate indices of mobility and equality are presented below. Nonetheless it is unclear that there has been a common trend in Europe on educational intergenerational mobility.

Two measures of inequality are used: the coefficient of variation and the Gini coefficient. The former, which is defined as the standard deviation divided by the mean, is a measure of the dispersion in the distribution. The latter is a traditional measure of inequality representing the area between the first diagonal and the Lorenz curve. The two indices are positively related but certainly not linearly so (Cowell, 1995). Two measures of mobility are also defined. The Eigenvalue index (ML)10, which summarizes the degree of mobility implicit in a transition matrix, indicates how rapidly one’s origin is ‘forgotten’. The ML attains a maximum of one in a situation of equal opportunities where each generation’s educational outcomes are independent of the previous generation’s. It has a minimum of zero when one’s educational attainment is entirely determined by the previous generation’s education. The Bartholomew index is based on measuring the average number of boundaries crossed between generations (Bartholomew, 1973).11 The index attains a minimum of zero when all the non-diagonal elements are zero and everyone has the same educational level as their parents. While intuitively one expects these two indices to be correlated there is no compelling reason why they should display the same pattern as they reflect different underlying concepts: respectively, how long does it take to forget past influences, and how far can one be expected to move in one generation?
3.1 The Relationship between Educational Mobility and Inequality

In Table 12.1 the rank correlations between the indices of mobility and inequality are reported across countries. The relationship between the two concepts is consistently negative and significant (at the 5 per cent level) in three out of four cases, suggesting that the most equal countries are also the most mobile ones.

The relationships between the Eigenvalue index and the coefficient of variation, on the one hand, and the Bartholomew index and the Gini coefficient, on the other, are plotted in Figures 12.2 and 12.3, respectively. Germany, Great Britain, Switzerland and, surprisingly, Sweden are characterized by a large dispersion of the educational distribution. Germany, Sweden and Switzerland along with Italy and the Netherlands are also characterized by larger Gini coefficients. As far as mobility is concerned country ranking is dependent on the index used and only Belgium is
Table 12.1  Tests of rank correlation: Kendall’s tau

<table>
<thead>
<tr>
<th>Indices of mobility</th>
<th>Gini coefficient</th>
<th>Coefficient of variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartholomew</td>
<td>-0.451</td>
<td>-0.3595</td>
</tr>
<tr>
<td></td>
<td>(-0.0100)</td>
<td>(-0.0408)</td>
</tr>
<tr>
<td>Eigenvalue</td>
<td>-0.2157</td>
<td>-0.3595</td>
</tr>
<tr>
<td></td>
<td>(-0.2255)</td>
<td>(-0.0408)</td>
</tr>
</tbody>
</table>

Note: The number in parentheses is the *p*-value of a test for independence under the null hypothesis.

Figure 12.2  Eigenvalue index against the covariance coefficient of schooling

consistently ranked as a highly mobile nation. In this dataset, the USA is surprisingly found to provide a high level of equality. In both figures, a non-parametric regression line highlights the negative relationship. In general, countries with egalitarian education systems in terms of the outcome of schooling completed also enjoy greater educational mobility. These results
are not consistent with the incentive trap theory. They do not, however, distinguish between structural and exchange mobility which could be why Denmark, Finland and Norway appear so mobile since these countries experienced an increase in intergenerational mobility over the period.

**Figure 12.3**  **Bartholomew index against the Gini coefficient of schooling**

### 3.2 Gender Differences

If mobility and equality are determined by the country’s education system, then little differences by gender should be observed as only traditions and, more importantly, labour market conditions (wage, experience) which differ by gender would convey extra incentives to invest in education for males. Despite gender wage inequality, we nonetheless find that all indices of mobility and inequality are essentially the same between genders (Table 12.2, Panel A). This gender equality in equality and mobility provides some support for an institutional origin of the relationship between family background and educational attainment.
Intergenerational Educational Mobility

Table 12.2  Indices of mobility and inequality by gender and age

<table>
<thead>
<tr>
<th></th>
<th>Indices of mobility</th>
<th>Indices of inequality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bartholomew index</td>
<td>Eigenvalue index</td>
</tr>
<tr>
<td>Panel A: by gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>0.91 (-0.155)</td>
<td>0.692 (-0.104)</td>
</tr>
<tr>
<td>Women</td>
<td>0.884 (-0.147)</td>
<td>0.674 (-0.083)</td>
</tr>
<tr>
<td>Panel B: by cohort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age less than 45</td>
<td>0.895 (-0.166)</td>
<td>0.748 (-0.102)</td>
</tr>
<tr>
<td>Age 45 or more</td>
<td>0.861 (-0.155)</td>
<td>0.555 (-0.082)</td>
</tr>
</tbody>
</table>

Note: Standard errors are reported in parentheses.

3.3 The Role of Labour Market Incentives

As suggested by Checchi et al. (1999), intergenerational mobility might be affected by labour market characteristics, primarily the rate of return to education. To test this assumption, we report the relation between estimates of the marginal return to education for a sub-set of the countries in our data and a measure of mobility. Since typically returns differ by gender, Figure 12.4 plots the return to schooling against the Eigenvalue index of mobility for males only. The relationship between mobility and returns is weak. For example, Scandinavian countries are well-known to have low returns to education largely as a result of a high compression of the income distribution. Yet, this has not significantly depressed educational mobility as compared to high-return economies in less social democratic societies such as Britain, Ireland or the USA. The international evidence only provides weak support for the incentive trap theory. Note that, as in Checchi et al. (1999), we observe that Italy has lower mobility and lower returns than the USA.

3.4 Has the Relationship Changed over Time?

As most countries have experienced an expansion of education since the 1960s, it is natural to assess whether this has affected intergenerational mobility. Having a single cross-section for each country, we can only calculate the indices for two age groups. Panel B of Table 12.2 above reports the value of the four indices for both cohorts. Intergenerational mobility increased over time especially when relying on the Eigenvalue
index. Concomitant with the increased mobility, there was also an increase in equality, with both indices being reduced by about 30 per cent over time.

One pattern that consistently emerges is that increased mobility is strongly associated with a lower initial level of mobility, as pictured in Figure 12.5 for the case of the Eigenvalue index. What it does not imply is that there is a tendency towards convergence of mobility patterns across countries. Such a conclusion would be a case of Galton’s fallacy.

4 MICRO-LEVEL ANALYSIS

The relationship between the educational levels of both generations is also explored at the individual level. Compared to the macro-level correlations presented in the previous section, this allows us to control for individual characteristics. While the previous section focused on summary measures of mobility, now the marginal effects of interest are estimated after controlling for gender, age, disability status and language spoken at home.
The interpretation of the results is not very intuitive since the dependent variable is a cohort-adjusted index of qualification. Hence we will concentrate on the sign and relative size of coefficients. Pooling all the countries, having a father with an extra level of qualification increases the attainment compared to the respondent’s country and age adjusted mean. This effect is precisely estimated and dwarfs any other effect. On the other hand, being disabled and not speaking the country’s language at home both reduce attainment. Females are found to have less education than males. We then interact, in three different models, paternal education with gender, country and cohort. As observed in the macro evidence there is a general decline in the correlation between parental and child education over time (–10 per cent) and large country differences. The most mobile countries are Finland and Switzerland (German and French speakers) and the least mobile Germany, Ireland, Italy and Poland. These estimates are similar to those obtained when estimating the model country by country (Table 12.3).

As in Checchi et al. (1999) Italy is found to be less mobile than the USA. The Nordic countries and Switzerland tend to experience greater intergenerational mobility. The expectation for the central and eastern European countries is that their communist past should have made the
distribution of education in these countries relatively egalitarian and independent of paternal influence. However, ex-communist countries are not specifically mobile with Poland and Slovenia even exhibiting rather high levels of paternal influence on the educational achievement of their offspring. There is also no evidence of large differences between the older cohort who would have been born pre-communism and the younger cohort (Figure 12.6). The rest of continental Europe appears fairly immobile. As shown in the macro analysis, the least mobile countries have in general experienced a larger drop in the estimates of the paternal effect.

**Table 12.3 Estimates of paternal qualification on highest qualification attained**

<table>
<thead>
<tr>
<th>Country</th>
<th>Pooled model</th>
<th>Country-specific regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>0.395</td>
<td>0.394 (0.025)</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>0.408</td>
<td>0.409 (0.021)</td>
</tr>
<tr>
<td>Denmark</td>
<td>0.340</td>
<td>0.340 (0.023)</td>
</tr>
<tr>
<td>Finland</td>
<td>0.231</td>
<td>0.234 (0.019)</td>
</tr>
<tr>
<td>Germany</td>
<td>0.540</td>
<td>0.542 (0.034)</td>
</tr>
<tr>
<td>Great Britain</td>
<td>0.401</td>
<td>0.399 (0.027)</td>
</tr>
<tr>
<td>Hungary</td>
<td>0.375</td>
<td>0.374 (0.020)</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.518</td>
<td>0.518 (0.029)</td>
</tr>
<tr>
<td>Italy</td>
<td>0.479</td>
<td>0.477 (0.020)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.403</td>
<td>0.406 (0.021)</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>0.329</td>
<td>0.328 (0.028)</td>
</tr>
<tr>
<td>Norway</td>
<td>0.336</td>
<td>0.335 (0.020)</td>
</tr>
<tr>
<td>Poland</td>
<td>0.492</td>
<td>0.495 (0.024)</td>
</tr>
<tr>
<td>Slovenia</td>
<td>0.457</td>
<td>0.459 (0.022)</td>
</tr>
<tr>
<td>Sweden</td>
<td>0.312</td>
<td>0.310 (0.021)</td>
</tr>
<tr>
<td>Switzerland (D)</td>
<td>0.218</td>
<td>0.224 (0.024)</td>
</tr>
<tr>
<td>Switzerland (F)</td>
<td>0.291</td>
<td>0.293 (0.025)</td>
</tr>
<tr>
<td>USA</td>
<td>0.355</td>
<td>0.358 (0.022)</td>
</tr>
</tbody>
</table>

*Note:* Paternal qualification and own qualification are adjusted for country-specific quadratic trend. The pooled model reports the sum of the effect of parental education and the interaction between parental education and country. All interaction terms are significant with a $t$-value ranging from 9 to 600. The regression also controls for gender, a quadratic in age, disability status and language spoken at home. Standard errors are reported in parentheses.

Gender differences are indeed limited; the correlation between the country-specific estimates of father’s effect for sons and for daughters is 0.80. The intergenerational correlation in education is, on average, marginally
smaller for women (Figure 12.7). The largest gaps by gender are observed for Germany, Ireland and, to a lower extent, Great Britain where the intergenerational correlation is 10 percentage points larger for men than for women. These reduced intergenerational ties between father and daughter compared to father and son have also been found in the previous literature (Behrman, 1997).

Contrary to the incentive trap theory, countries with high returns to education (say more than 5 per cent in Figure 12.4 above) tend to be the least mobile. This suggests that when returns are high, more educated parents invest more in the education of their children maybe through private school, private tuition or better peers. High returns appear to reduce intergenerational mobility in education. With the exception of Ireland, the relationship between parents’ and the child’s education also tends to be more stable over time in countries with the highest returns (Figure 12.6 above).
5 FURTHER DISCUSSION

We now compare our estimates with Comi’s (2003) intergenerational education correlation estimates. As discussed previously, Comi’s estimates may be seriously biased due to self-selection of the population and measurement difficulties in the ECHP. Nonetheless they have the advantage of being based on a single dataset which overlaps with the IALS (eight countries). Comi’s estimates are reported in Table 12.4. For the countries found in both studies, the rank correlation reaches 0.43 and we can reject that the two rankings are independent.

We also investigated whether institutional factors could explain the observed pattern of mobility across Europe. This analysis is only tentative and rather crude since we use measures in 1995 which may not reflect the institutional conditions faced by different cohorts. Nonetheless we find negative correlations, ranging from –0.3 to –0.5, between intergenerational correlation in education and both the share of public expenditure in tertiary
education and the percentage of GDP spent on education. Hence more mobile countries are also those in which the state plays a greater role in education.19

Finally, most countries have promoted participation in tertiary education over time. Universal access to university would be associated with a reduction in the effect of paternal education whereas, if the expansion of tertiary education is due to more pupils from a favoured background gaining access, no reduction (or even possibly an increase) in the paternal educational effect will be observed. We calculate the correlation between the difference in the proportion of a cohort obtaining tertiary-level education and the evolution of the educational mobility between the two cohorts and only find a weak negative correlation (−0.15). The lack of correlation reported here does not support the argument that expansion policies have substantially increased access to universities to pupils from a socially lower family background.

Table 12.4 Estimates of intergenerational mobility from fathers to sons in education

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of observations</th>
<th>Eigenvalue (standard error)</th>
<th>Rank based on Eigenvalue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>1,136</td>
<td>0.095 (0.023)</td>
<td>4</td>
</tr>
<tr>
<td>Denmark</td>
<td>329</td>
<td>0.114 (0.540)</td>
<td>5</td>
</tr>
<tr>
<td>Netherlands</td>
<td>707</td>
<td>0.061 (0.033)</td>
<td>2</td>
</tr>
<tr>
<td>Belgium</td>
<td>546</td>
<td>0.185 (0.053)</td>
<td>8</td>
</tr>
<tr>
<td>France</td>
<td>1,054</td>
<td>0.298 (0.035)</td>
<td>12</td>
</tr>
<tr>
<td>UK</td>
<td>637</td>
<td>0.089 (0.061)</td>
<td>3</td>
</tr>
<tr>
<td>Ireland</td>
<td>1,510</td>
<td>0.276 (0.034)</td>
<td>10</td>
</tr>
<tr>
<td>Italy</td>
<td>2,758</td>
<td>0.210 (0.019)</td>
<td>9</td>
</tr>
<tr>
<td>Greece</td>
<td>1,568</td>
<td>0.149 (0.020)</td>
<td>6</td>
</tr>
<tr>
<td>Spain</td>
<td>2,780</td>
<td>0.160 (0.025)</td>
<td>7</td>
</tr>
<tr>
<td>Portugal</td>
<td>1,626</td>
<td>0.296 (0.043)</td>
<td>11</td>
</tr>
<tr>
<td>Austria</td>
<td>884</td>
<td>0.045 (0.440)</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Comi (2003).

6 CONCLUSIONS

Whilst there is a considerable literature estimating intergenerational correlations in educational achievement, this chapter relates it to measures of the equality of the education system using a cross-section of European countries and the USA. The assumption being tested is whether a more equal system leads to greater intergenerational mobility or, as was found in Checchi
et al. (1999), whether lower returns to education – usually associated with a more equal system – counterbalance the initial relationship (the incentive trap theory). The analysis was presented first at the macro level where several indices of mobility and equality were presented, and then at the individual level exploiting the homogeneity of the dataset for a large number of countries.

Using scalar indices of educational mobility as movement between generations and mobility as equality of ex-post opportunity, we show that the country rankings of mobility and opportunity are not independent of the index used, even though the indices are positively correlated. At the macro level there is a negative relationship between mobility and educational inequality. This is not consistent with the incentive trap theory which predicts that low returns to education, associated with greater equality, should generate low intergenerational mobility. For these countries, no relationship between mobility and labour market incentives is found. Mobility tends to be higher for men than women whilst educational inequality, by contrast, is pretty much the same for both sexes. Mobility has risen over time especially in countries which started from a lower point. This does not, however, imply convergence.

The analysis at the individual level allows us to control for trends in education for both generations. Again, a large gradient of intergenerational mobility is found with Switzerland and the Nordic countries being the most mobile. Intermediate economies, former communist countries but also Germany and Italy are characterized by large paternal effects on the educational attainment of their offspring. Between the two cohorts, mobility has generally increased especially in countries with initial low mobility. Furthermore, change in intergenerational mobility is not associated with the expansion of tertiary education, which casts doubt on the argument that policies increasing access to university have affected the social background of pupils going to tertiary-level education. However, public interventions in education are in general correlated with greater mobility, and we find that more equal countries have greater intergenerational mobility in education. Policies improving opportunities for less favoured children may thus have long-term consequences on the second generation.

NOTES

1. Our thanks to Statistics Canada that provided the data, to Daniele Checchi and seminar participants at the universities of Tokyo, Lille, Southampton, Stockholm and Harvard for comments. The opinions expressed in this chapter are those of the authors and not Statistics Canada nor the OECD that coordinated the collection of the data.
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3. A downside of using education is of course that the intergenerational correlation may have different implications for income in different countries depending on the returns to education. However, one could argue that the intergenerational correlation in education is one of the mechanisms explaining income mobility.

4. Mobility is observed ex post so that even if ex ante mobility is high it does not follow that we will observe it. Nor can we assume that mobility is desirable per se; a country randomly allocating individuals’ educational levels would have high mobility but be inefficient and inequitable.

5. The argument is similar to Barr (2004).

6. However, these conclusions are sensitive to the choice of family background measure. When using parental education, the USA is found to be less mobile than Europe, and Germany one of the most mobile countries. The author focuses the analysis on the number of books as this is a comparable measure across all countries.

7. For an extensive review of the evidence of financial effects on educational attainment, see Blanden and Gregg (2004).

8. The data for Belgium refers to Flanders only. For Switzerland the data refers to French and German speaking areas, although data on the Italian speaking minority was available. The average size of the sample per country is around 2 000. France withdrew from the study in 1995 citing concerns over comparability.

9. This over-representation of the younger populations stems from the exclusion of observations for which no information on the parental education was available.

10. The Eigenvalue index (ML) is defined as

\[ ML = 1 - \frac{\lambda_2}{\lambda_1} \]

where \( \lambda_2 \) is the second largest eigenvalue, the largest eigenvalue of any transition matrix being one. If \( \lambda_2 \) is equal to zero, then the transition matrix equals to the limiting invariant matrix and corresponds to equality of opportunity.

11. Formally, it is given by

\[ B = \sum \sum f_{ij} \frac{|i-j|}{\sum \sum f_{ij}} \]

where \( f_{ij} \) is the joint frequency in the \( i,j \)-th cell of the transition index and the modulus of \( |i-j| \) is the number of changes in the educational level made from one generation to the next. In essence it is summarizing how far the population is from the principal diagonal of the matrix.

12. These are estimated from the International Social Science Project data, since income is only reported in five categories in the IALS, using the standard Mincer equation for hourly wage. Details on these returns can be found in Denny et al. (2002).

13. A comparable plot for females is available from the authors and reveals a similar relationship.

14. These conclusions are, somehow, sensitive to the choice of measure of mobility as, when using the Eigenvalue index, the relationship between mobility and returns to education is almost flat.

15. Clearly the age ranges of the fathers in the two cohorts are likely to overlap.

16. For the Bartholomew index (not shown here) the relationship is less steep but clearly negative. This inverse relationship between changes and initial levels is a very common finding in the analysis of time series, for example in the literature on cross-country growth where it is commonly denoted ‘beta convergence’ in economic growth literature and is essentially ‘regression to the mean’.

17. Additionally, the educational attainment of both generations is detrended using for each country a quadratic in the age of the respondent. For the first generation, this does not provide an accurate measure of the relative education attained. However, we argue that
what matters is the relative education of the father compared to the fathers of the peers of his child.

18. This coefficient was estimated by OLS on the detrended variables. A similar estimate can be obtained using the non-detrended variables either by OLS or by ordered probit and including a quadratic function of age.

19. A recent series of studies has investigated the issue of educational tracking and its effects on intergenerational correlation in education (Ammermüller, 2005; Schuetz et al., 2005).

REFERENCES

Ammermüller, A. (2005), Educational opportunities and the role of institutions, Mannheim: ZEW Discussion Paper No. 05–44.
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