

V. INVESTMENT IN HUMAN CAPITAL THROUGH POST-COMPULSORY EDUCATION AND TRAINING

Introduction and summary¹

Post-compulsory education raises efficiency and equity issues

Human capital accumulation is an important determinant of individuals' earning capacity and employment prospects, and therefore plays an important role in determining the level and distribution of income in society. Recent OECD work has also confirmed the importance of investment in education as a determinant of economic growth² and education is also found to be associated with various non-economic benefits.³ Across countries, there is a broad consensus that some degree of government involvement is needed in the provision of educational services. All OECD countries seek to ensure that all young people enter working life with a minimum amount of human capital acquired during the years of compulsory education. However, governments are also heavily involved in the financing and delivery of post-compulsory education and training where returns may to a larger extent accrue to the individual and where participation is by choice. This element of discretion highlights the importance of incentives, raises certain equity issues and indeed questions about the appropriate role of government in the provision of such education and training.

This chapter examines various efficiency and equity aspects of post-secondary education and training. The first section assesses current incentives for young people to participate in upper-secondary and tertiary education immediately following compulsory schooling and the extent to which these incentives are aligned with the returns to society. The following section addresses the incentives for older adults to invest in human capital through formal education and for employers to offer training to their employees. The final section discusses some equity issues related to post-compulsory education and training. The analysis presented in this

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1. This chapter draws on a study on the efficiency and equity aspects of investment in post-compulsory education and training by the Economics Department and the Directorate for Education, Employment, Labour and Social Affairs. For the detailed study, see Blöndal *et al.* (2001).
 2. See Bassanini and Scarpetta (2001) and OECD (2001a).
 3. These may include better health and, for many people, enjoyment derived from the process of learning and the exercise of learnt skills independently of monetary rewards. See OECD (2001b) for a review of studies on the non-economic benefits of education.

chapter abstracts from any non-economic benefits, reflecting the difficulty to translate these into monetary values.

The main conclusions of this analysis are the following:

Post-compulsory education results in significant gains for young people...

- Human capital investment in all countries is associated with significant labour-market gains for the individuals in question, such as higher post-tax earnings, higher participation in the labour market and improved employment probability.
- The costs to individuals of pursuing post-compulsory education differ across countries and are strongly influenced by policy-related factors including the length of education programmes, the subsidisation of tuition fees and public financial support to students.
- Private internal rates of return for young people who successfully pursue a post-compulsory education suggest that there are strong incentives for the average student to engage in education activity. Social rates of return are also high, even if they are lower than the private rates, and point to the benefits of investment in post-compulsory education for society as a whole.

... but the net benefits fall with age

- Incentives to invest in formal education diminish at an increasingly rapid rate as a function of age, reflecting a shorter period to amortise investment costs and higher costs in terms of foregone earnings. Private internal rates of return are correspondingly low and fall strongly with age.

Employers benefit from training their employees

- The limited evidence available shows that employers have an incentive to train their employees since such activity results in higher productivity and profits.

Students in higher education come from favoured backgrounds

- Notwithstanding the expansion of enrolments in tertiary education in recent decades, students in higher education still tend to come from relatively favoured backgrounds.
- Financing arrangements in post-compulsory education tend to be regressive. Those not participating in post-compulsory education -- typically people from disadvantaged backgrounds -- do not benefit at all from public funding while graduates from tertiary education institutions receive large government subsidies, even though they are likely to come from relatively well-off families and have high-income prospects.

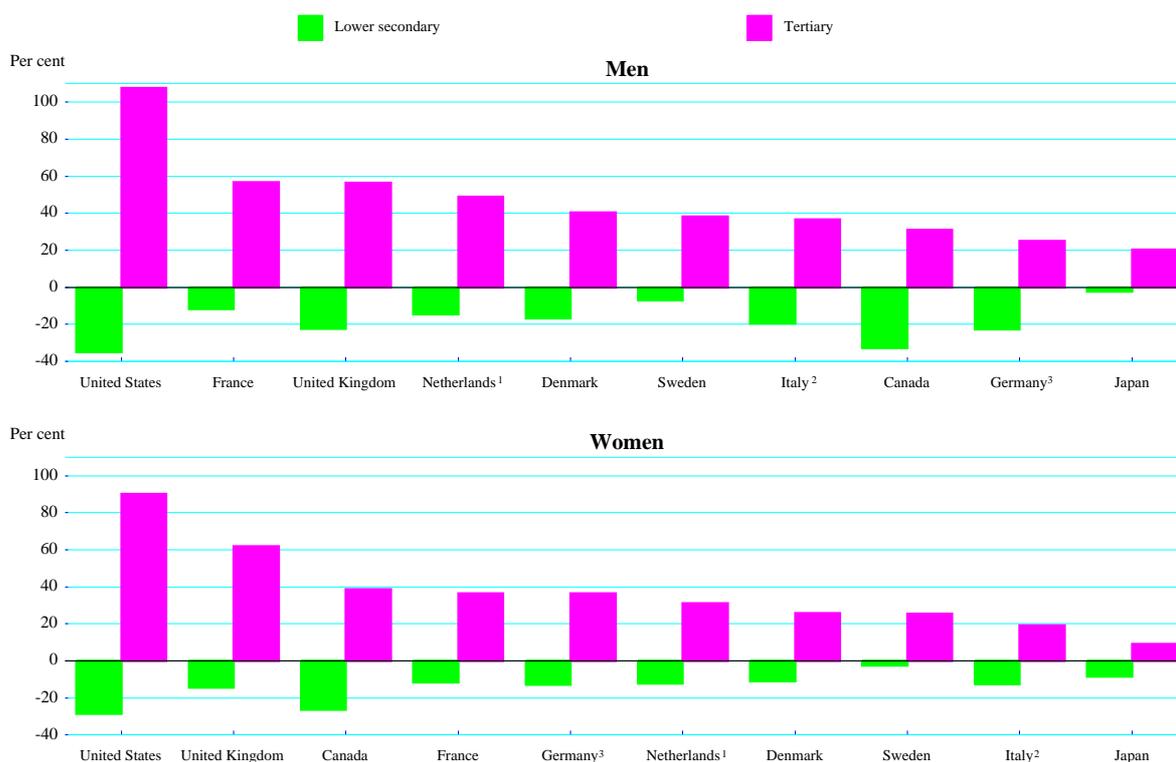
The benefits of post-secondary education for individuals

Labour-market benefits of additional human capital for individuals

Better education results in higher wages...

An important motivation for individuals to invest in education is that the acquired knowledge and skills tend to raise their productivity and hence earnings potential. Figure V.1 shows that the wage premium earned by tertiary graduates is substantial in all countries considered, and particularly high in the United States, France and the United Kingdom. Investment in upper-secondary education is also associated with significant wage premia over lower-secondary education, especially in the United States and Canada. This wage pattern is broadly the same for both men and women, although education wage premia tend to be somewhat smaller for women.

Figure V.1. Relative earnings of full-time workers by gender and level of educational attainment, 1999/2000
Per cent deviation from mean earnings at the upper secondary level



1. 1997.

2. Annual post-tax earnings.

3. 1998.

Note: Countries are ranked in descending order in terms of the tertiary earnings progression. Wage premia are not standardised for different age and seniority compositions of educational groups across countries.

Source: National statistical institutes. See Blöndal et al.(2001).

Education appears to provide not only an initial earnings advantage but also a wage premium that increases with time spent in the labour market.⁴ In most countries the earnings of tertiary-educated men and women increase more sharply with age than is the case for less-educated workers.⁵ The main exception is Japan where all the main educational groups register a decline in earnings towards the end of their careers.⁶ The progression in women's earnings towards the end of their working life is somewhat smaller than for men in some countries, which could reflect greater barriers for them to advance to higher levels in the job hierarchy (Blau and Kahn, 2000).

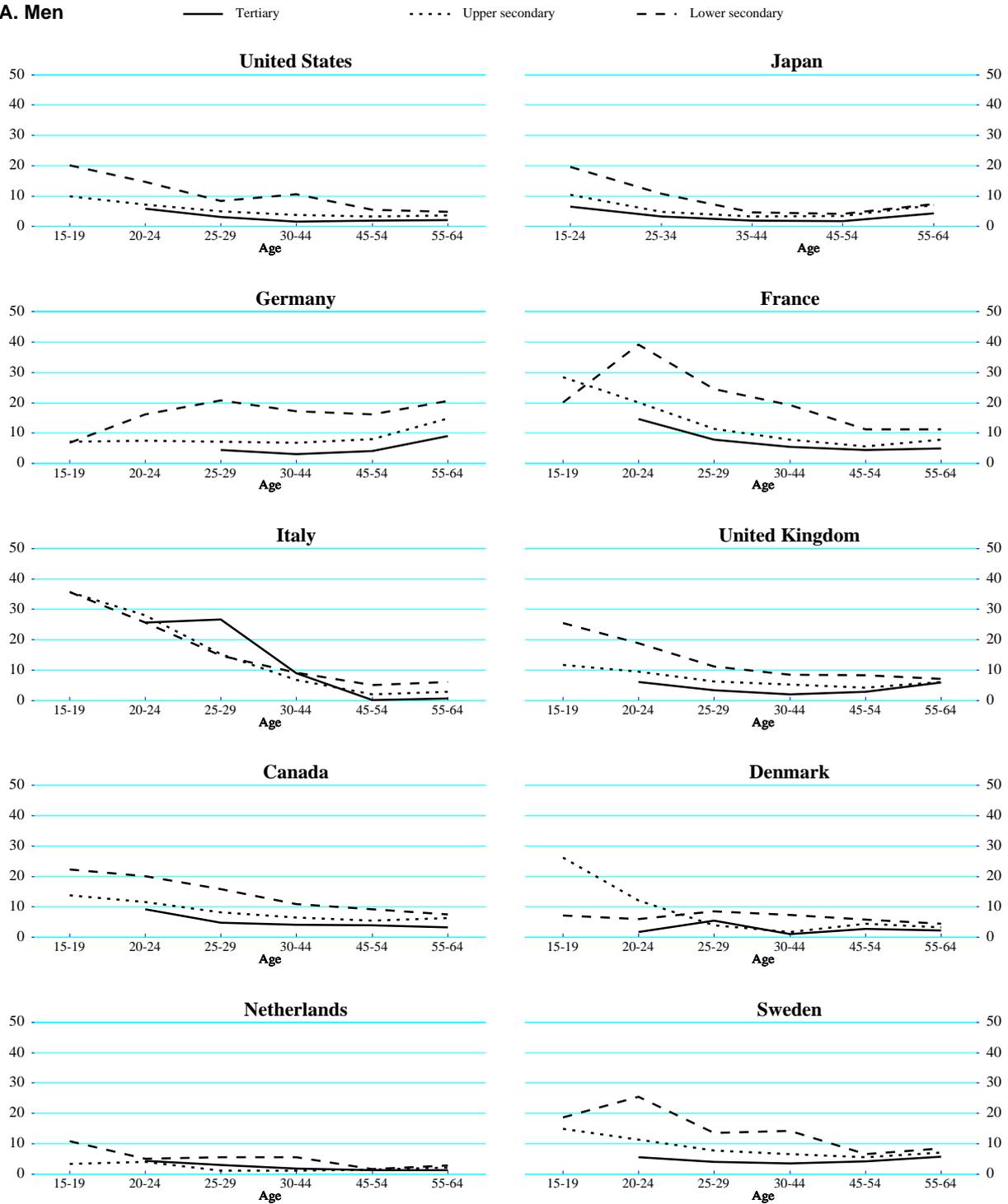
... and stronger attachment to work

A further important motive behind acquiring more education is to lower the risk of unemployment. The reduction in risk is particularly large for those investing in upper-secondary education, whereas the gap in unemployment rates between upper-secondary and university-educated workers is comparatively small (Figure V.2). The difference in unemployment risk across educational categories is notably large for young persons, but it tends to narrow with age.⁷ Moreover, educated workers are more likely to participate in the labour market, and their active working life is generally longer than that for those with lower educational attainment.⁸

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4. Additional evidence of the labour market benefits of post-compulsory education is available in Blöndal *et al.* (2001).
 5. However, human capital acquired during formal schooling is subject to some depreciation due to technological change and other factors (Ramirez, 2001). These effects put downward pressure on the earnings of older workers.
 6. This pattern reflects the Japanese seniority pay system and the mandatory age of retirement. This arrangement results in the well-known fact that older workers in Japanese firms leave their "career" employer prior to permanent withdrawal from the labour market, transferring to a related company (subsidiary) where earnings are lower. Because the mandatory retirement age from a career job intervenes before the employee becomes eligible for a public pension, there are strong incentives for older workers to continue work at lower wages.
 7. High youth unemployment may also provide a strong incentive for young people to continue their studies beyond the compulsory school-leaving age, as this will tend to reduce the opportunity cost of such activity. The increasing number of youths participating (and staying longer) in education in the 1990s in several countries is thus partly a natural response to the weak state of the youth labour market.
 8. See Blöndal *et al.* (2001) for cross-country comparisons.

Figure V.2. Unemployment by level of educational attainment, gender and age, 1999
Percentage of labour force

A. Men

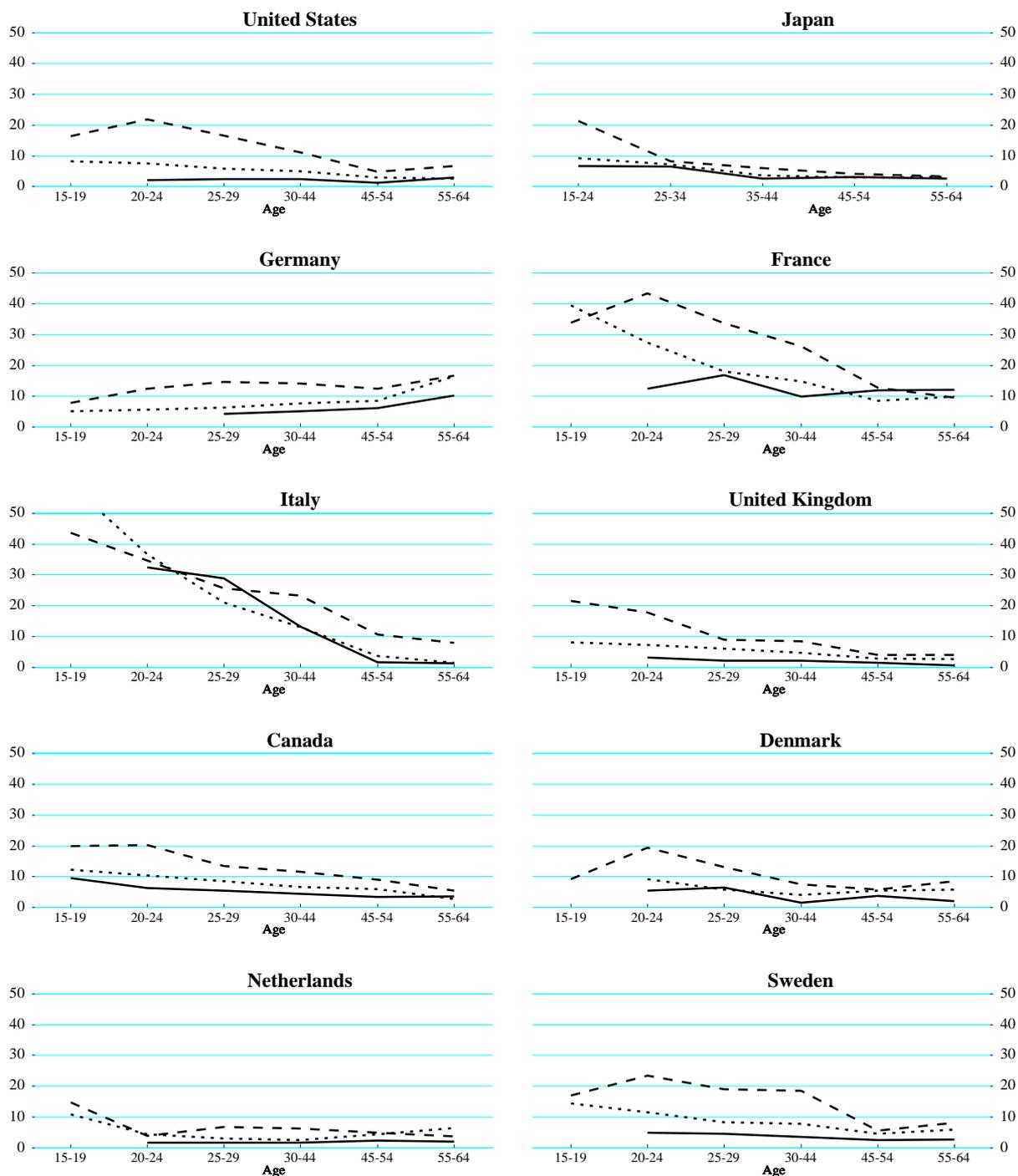


Source: OECD (2001d).

Figure V.2. Unemployment by level of educational attainment, gender and age, 1999 (continued)
Percentage of labour force

B. Women

— Tertiary ····· Upper secondary - - - Lower secondary



Source: OECD (2001d).

Policy factors affecting the costs and benefits of additional human capital for individuals

Incentives to invest in education are influenced by subsidised tuition...

Public financing of provision has been the traditional means in most countries to encourage post-compulsory education. At the upper-secondary level, the general academic stream is predominantly funded by government in most countries, while vocationally-oriented programmes are often privately funded. At the tertiary level, the average subsidy rate ranges from 50 per cent or less in Japan, Korea and the United States to close to 100 per cent in some European countries, such as Austria, Denmark, Iceland, the Netherlands and Switzerland.

... length of study periods...

The theoretical or minimum length of study periods is another policy variable that influences the financial rewards from human capital accumulation. Thus, very long study periods will tend to discourage investment in education unless they are associated with equivalent extra gains in productive capacity, and hence earnings potential. Standard upper-secondary education programmes in most OECD countries last for two or three years, and the proportion of students that extend their studies beyond this theoretical length is small. The theoretical length of first-degree tertiary education programmes varies from three to five or more years across OECD countries. Countries with relatively short first-degree programmes include France and the United Kingdom, while long programmes are standard in Germany and Austria.

... student loans and grants...

Most OECD countries have also sought to support educational activity by offering financial assistance to individuals during their tertiary studies. Indeed, in the absence of government intervention investment in human capital is difficult to finance for persons without other collateral. As documented in Blöndal *et al.* (2001), student loan and grant arrangements differ significantly across countries in terms of the extent of income and asset testing of both students and their parents, the amount of financial assistance, and the interest rate and repayment schedules of loans. Indeed, the maximum annual loan and grant entitlement in Japan, the United Kingdom and the Netherlands is close to a half of the opportunity costs of lost earnings plus fees while it ranges from a tenth to a third in the other countries. Similarly, the implied subsidy rate⁹ varies significantly across the ten countries reviewed. It is over 20 per cent in the Netherlands, Germany, Denmark and the United Kingdom, falling to around 10 per cent or less in Japan and France.

9. The subsidy rate is calculated as the net present value (NPV) of the grants and maximum loans available during study periods as a proportion of the NPV of the overall cost involved with the studies (*i.e.* lost earnings and tuition fees). See Blöndal *et al.* (2001) for detailed analysis.

... and the tax system

A progressive income tax system will work to discourage education activity as it implies a tax on human capital. By taxing the earnings of the better-educated at a higher rate than applied to the earnings of the less-educated, the post-tax earnings differential is narrowed and the gains from human capital investment lowered. Among the ten countries reviewed, the gap between the average tax rate on the earnings of upper-secondary and tertiary graduates is particularly large in the United States due to the large earnings differential. By contrast, earned income of lower, upper-secondary and university-educated workers are taxed at a similar marginal rate in Japan.

Internal rates of return to education

The private internal rate of return to post-compulsory education...

The overall financial incentives to invest in human capital that are embedded in the labour market benefits, financing and tax arrangements discussed above can be summarised in estimates of private real internal rates of return (Table V.1). The internal rate is the discount rate that equalises the real costs of education during the period of study to the real gains from education thereafter (see Blöndal *et al.* (2001) for detailed methodological issues). In its comprehensive form, the costs equal tuition fees, foregone earnings net of taxes adjusted for the probability of being in employment minus the resources made available to students in the form of grants and loans. The benefits are the gains in post-tax earnings adjusted for higher employment probability minus the repayment, if any, of public support during the period of study. The calculations assume that the student is in full-time education and has no work activity, and hence no earnings while studying.¹⁰ Moreover, as the probability of course drop-out has not been taken into account, the reported internal rates are conditional on successful completion of the relevant education programmes.

... is generally high...

The estimated private real internal rates of return to upper-secondary and university education differ significantly across the countries listed in Table V.1. They are generally higher than the real interest rate or the rate of return on other productive assets, suggesting that human capital investment is an attractive way for the average person to build up wealth.¹¹ For tertiary studies, three groups of countries can be identified depending on the estimated values of the “comprehensive” internal rate. Firstly, with its very high rewards from tertiary education, the United Kingdom is in a group of its own. Second, the United States, France, Denmark, the Netherlands and Sweden are characterised by relatively high internal rates of return, ranging from 11 to 15 per cent.

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10. The calculated rates of return are likely to be biased upwards as unemployment and retirement benefits are not taken into account. However, Brunello (2001) suggests that the inclusion of the unemployment risk may exaggerate the impact of unemployment on the financial reward of education because unemployment may have more detrimental effects on subsequent earnings of those with higher education.
 11. The existence of non-economic benefits would reinforce this argument as, if quantified, they would raise further the calculated rates of return.

Third, in the remaining countries rates are below 10 per cent, with the lowest rates recorded for Italy and Japan. For upper-secondary education, the internal rate is calculated to exceed 10 per cent in all countries listed in Table V.1 with the exceptions of Japan, the Netherlands, Sweden and Germany (women).¹²

... primarily due to earnings differentials and length of education...

As can be seen from Table V.1, earnings differentials and the length of education are generally the prime determinants of the private internal rates of return. Thus, countries with strong overall incentives to invest in human capital are typically characterised by high education-earnings differentials and/or relatively short education programmes, and *vice versa*. The influence of other factors (elaborated below) does, however, generate notable exceptions to this general pattern. Thus, despite narrow wage differentials and long study periods, Denmark and, to a lesser extent, Sweden offer comparatively strong incentives to acquire university education. And France has strong incentives for young people to invest in upper-secondary education despite relatively small wage gains compared to the length of such education.

... but other factors also play a role

The contributions of the other factors can be evaluated by adding them successively to the estimate of the “narrow” rate derived from only pre-tax earnings and study length:¹³

- *Taxes* reduce the narrow rate by 1¼ percentage point on average for tertiary education and 1 percentage point for upper-secondary education. At the tertiary level, the impact of taxes is particularly strong in the United Kingdom and the United States. At the upper-secondary level, the depressing effect of the tax system is most notable in Germany, while it is the smallest in Japan.

12. Reflecting somewhat different data sources and methodology, these estimates differ in some cases from earlier OECD estimates of internal rates of return (OECD, 1997 and 1998). The estimates reported in Table V.1 are broadly in line with the results of empirical studies that derive rates of return from earnings regressions using micro data (*e.g.* Card, 1999 and 2000; O’Donoghue, 1999; and Barceinas-Paredes *et al.*, 2000).

13. This implies that the impact of the other factors is conditional on the earnings gains and the length of education.

Table V.1. Private internal rates of return to education, 1999-2000

<i>Per cent</i>											
A. Men											
	United States	Japan	Germany	France	Italy ^a	United Kingdom	Canada	Denmark	Netherlands ^b	Sweden	Unweighted average
Tertiary education											
Return based on pre-tax earnings and the length of studies (narrow rate)	18.9	8.0	7.1	13.3	6.7 ^d	18.1	8.4	7.9	11.7	9.4	11.4 ^c
<i>Impact of</i> (in percentage points)											
Taxes	-2.3	-0.3	-1.5	-1.6	..	-2.1	-0.5	-0.4	-2.0	-1.5	-1.3
Unemployment risk	0.9	0.9	1.1	2.4	0.5	1.6	1.3	1.1	0.0	1.2	1.1
Tuition fees	-4.7	-2.0	-0.3	-1.1	-0.7	-2.7	-2.3	-0.1	-0.6	-0.7	-1.5
Public student support	2.1	1.3	2.7	1.3	0.0	3.6	1.8	5.2	2.9	3.0	2.4
Comprehensive rate	14.9	7.9	9.1	14.3	6.5	18.5	8.7	13.7	12.1	11.4	11.7
Upper-secondary education											
Return based on pre-tax earnings and the length of studies (narrow rate)	14.4	4.4	10.0	7.5	9.5 ^d	12.4	11.9	11.3	6.9	3.9	9.2 ^c
<i>Impact of</i> (in percentage points)											
Taxes	-0.9	-0.2	-2.1	-1.0	..	-1.5	-1.6	-2.2	-0.2	-0.6	-1.1
Unemployment risk	2.9	2.6	2.9	7.0	1.7	4.2	3.6	2.2	1.2	3.1	3.1
Comprehensive rate	16.4	6.8	10.8	13.5	11.2	15.1	13.6	11.3	7.9	6.4	11.3
B. Women											
	United States	Japan	Germany	France		United Kingdom	Canada	Denmark	Netherlands ^b	Sweden	Unweighted average
Tertiary education											
Return based on pre-tax earnings and the length of studies (narrow rate)	18.8	8.0	7.0	12.1		16.4	10.6	6.0	9.4	7.4	10.6
<i>Impact of</i> (in percentage points)											
Taxes	-2.0	-0.2	-1.6	-1.7		-2.3	-1.3	-1.1	-1.0	-0.7	-1.3
Unemployment risk	1.4	0.5	0.6	4.8		1.3	1.2	0.7	0.7	1.6	1.4
Tuition fees	-6.0	-2.4	-0.6	-1.7		-2.5	-2.9	-0.1	-0.7	-0.8	-2.0
Public student support	2.7	1.3	3.0	1.9		3.2	2.4	5.6	4.1	3.3	3.1
Comprehensive rate	14.7	7.2	8.4	15.4		16.1	9.9	11.1	12.5	10.8	11.8
Upper-secondary education											
Return based on pre-tax earnings and the length of studies (narrow rate)	10.6	6.6	6.1	10.5		..	10.8	8.3	7.9	..	8.7
<i>Impact of</i> (in percentage points)											
Taxes	-1.3	-0.2	-1.7	-0.7		..	-1.2	-1.4	-1.6	..	-1.2
Unemployment risk	2.5	3.0	2.6	8.1		..	3.1	3.6	2.1	..	3.6
Comprehensive rate	11.8	9.4	7.0	17.9		..	12.7	10.5	8.4	..	11.1

Note: The rates of return to tertiary education are calculated by comparing the benefits and costs with those of upper-secondary education. In the case of rates of return to upper-secondary education, the calculation compares the benefits and costs with those of lower-secondary education. In Sweden, the theoretical length of standard tertiary courses is used in the calculations rather than the average theoretical length of different programmes. Moreover, earnings differentials for women between upper and lower-secondary levels are not large enough to permit a positive rate-of-return calculation. In the United Kingdom, data on earnings of women up to age 30 with lower-secondary education were not available. In Italy, reliable data on earnings for women were not available.

a) 1998.

b) 1997.

c) Excluding Italy.

d) Post-tax earnings.

Source: Blöndal *et al.* (2001).

- *Unemployment risk* increases the internal rate of return notably for upper-secondary education, with the effect averaging 3½ percentage points in the countries under review.¹⁴ In France, it adds as much as 7 to 8 percentage points to the internal rate of return at the upper-secondary level. For tertiary education, the differential unemployment risks have much less effect on the rates of return, adding on average 1 to 1.5 percentage point for men and women, respectively.
- *Tuition fees* have a particularly important negative impact on rates of return to tertiary education in the United States, and, to a lesser extent, in the United Kingdom and Canada. In the continental European countries, the impact is significantly smaller due to the much lower level of tuition fees.
- *Public student grant and loan arrangements* at the tertiary level give a significant boost to incentives, averaging 2½ to 3 percentage points, compared with rates of returns excluding such support. The impact is particularly strong in Denmark, and, to a lesser extent, in the Netherlands and Sweden, while it is weak in Japan and France, and absent in Italy.

The social rate of return is also high

The benefits to society of additional education should be assessed on the basis of social rates of return which reflect the costs and benefits to society of investment in education, and these can differ significantly from private costs and benefits. The social cost includes the opportunity cost of people not participating in the production of output plus the full cost of providing education rather than only the cost borne by the individual. The social benefit includes the increased economy-wide productivity associated with the investment in education. While data on social costs are available for most OECD countries, information about the full range of social benefits is less readily available. For example, the possibility of growth externalities associated with education suggests that the observed earnings differentials might not fully account for the economy-wide efficiency gains, even if such externalities may be relatively smaller at the post-compulsory level of education. Indeed, a recent OECD study on the determinants of economic growth suggests that such positive externalities may be important.¹⁵ On the other hand, some studies suggest that a (small) part of the wage premium received by better educated individuals is due to the fact that educational attainments signal their inherent abilities to employers, rather than their higher productivity arising from investment in human

14. The inclusion of unemployment benefits in the rate-of-return calculation would lower the impact of the unemployment risk. As replacement rates move towards 100 per cent, the impact of the unemployment risk would go to zero.

15. See Bassanini and Scarpetta (2001).

capital.¹⁶

In view of the difficulty in constructing comprehensive social rates of return, Table V.2 presents estimates of a “narrow” definition that abstracts from any externality effects and assumes that all wage gains from education represent associated gains in productivity (likewise, the calculations do not take into account non-economic benefits, see Blöndal *et al.* (2001) for detailed methodological issues). On this basis, the social internal rates of return are generally significantly lower than the private internal rates of return in Table V.1, primarily reflecting that the social cost of education is higher than the private cost. Even so, social internal rates of return are typically well above 5 per cent in real terms for both upper-secondary and tertiary education, suggesting that investment in education may often be a productive use of public funds. The estimates suggest that the social internal rate of return is particularly high at both the upper-secondary and tertiary levels in the United States and the United Kingdom, while it is the lowest in Japan at both of these education levels. In France, it is small for upper-secondary education but comparatively high at the tertiary level.

Table V.2. **Narrow estimates of social rates of return to education, 1999-2000**
Per cent

	Upper-secondary education		Tertiary education	
	Men	Women	Men	Women
United States	13.2	9.6	13.7	12.3
Japan	5.0	6.4	6.7	5.7
Germany	10.2	6.0	6.5	6.9
France	9.6	10.6	13.2	13.1
Italy ^a	8.4	..	9.7	..
United Kingdom ^b	12.9	..	15.2	13.6
Canada ^c	6.8	7.9
Denmark	9.3	8.7	6.3	4.3
Netherlands	6.2	7.8	10.0	6.3
Sweden ^d	5.2	..	7.5	5.7

Note: These calculations relate to a narrow definition of the social rate of return which exclude any possible positive external effects due to education. The rates of return to tertiary education is calculated by comparing the benefits and costs with those of upper-secondary education. In the case of the rates of return to upper-secondary education, the calculation is done by comparing the benefits and costs with those of lower-secondary education.

a) In Italy, reliable data on earnings for women were not available.

b) In the United Kingdom, data on earnings of women up to age 30 with lower-secondary education were not available.

c) In Canada, no data are available on expenditure per student at the upper-secondary level.

d) In Sweden, earnings differential for women between upper and lower-secondary levels are not large enough to permit a positive rate of return calculation.

Sources and Methods: see Blöndal *et al.* (2001).

16. The signalling role of education is analysed in Bedard (2001) for the United States and in Harmon and Walker (2001) for the United Kingdom.

***Internal rates of return
can be interpreted in
different ways***

The private and social internal rates of return reported above are generally well above the real interest rate and the rate of return on other productive assets. This may partly reflect that the calculations ignore educational failure but even correcting for this, rates of return are likely to remain high. One interpretation is that the high rates indicate a disequilibrium in the market for educated workers, with shortages of better-educated workers driving up their earnings. This might imply a temporary situation, where super-normal returns to education would subsequently generate enough supply response to push the rates down into line with returns available on other productive assets -- though this adjustment might take a long time.¹⁷ While temporary disequilibrium may account for some of the apparent “excess” returns, part of the super-normal returns may also reflect an equilibrium situation. This second interpretation would be relevant if the marginal rates of return are significantly lower than the average rates and thus closer to marginal rates on alternative productive assets.¹⁸ The marginal rate would indeed be lower than the average rate if the students at the margin are of lower ability and less motivated than the average students, and thus unlikely to be able to command the average wage premium in the labour market. On this interpretation, the high internal rates of return would partly reflect economic rents on a scarce resource, namely individual ability and motivation.

On either of the two interpretations, the authorities could enhance incentives for investment in education, for example, if it were to be possible to reduce the standard length of education programmes without compromising their quality and if they were to increase the generosity of student financial support. On the other hand, stronger incentives may not elicit a large supply response if there is a serious shortage of young people with the abilities and motivation required to profit from continued education. In this case, it might be more appropriate to improve the average abilities of young individuals through interventions at pre-schooling ages and in compulsory schooling, with studies indicating that cognitive abilities can be developed into teenage years.

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17. The speed of adjustment would importantly depend on the capacity of the education and training system to respond to the derived increase in demand and the capacity of the labour market to absorb the changing relative supplies of labour.
18. High private internal rates of return would also be compatible with equilibrium if individuals apply a high discount rate to future gains. Indeed, some studies on time preferences of individuals report very high discount rates, see *e.g.* Alessie and Kapteyn (2001).

Adult education: incentives for post-compulsory education and training

Incentives for older adults to pursue formal education programmes

The incentives to pursue education diminish as a function of age

The costs and benefits for older adults to participate in formal education programmes will differ from those for young people in important ways:

- The opportunity costs of foregone earnings will be significantly higher for older adults if education requires time out of work. Indeed, earnings tend to rise with age even if the progression is weaker for the lower educated than for the higher educated.¹⁹ This rising cost as adult workers age acts as a disincentive for them to invest in additional human capital.
- The eventual return in the form of higher earnings from formal education or training at older ages may be subject to considerable uncertainty. Making use of enhanced human capital may often require switching to another employer, in which case wage premia due to seniority or employer-specific skills will be lost and thus cancel part of the expected gains due to more education and training *per se*.
- Adult workers will often not have the same access to public financial support as their younger counterparts. In some countries, such as Germany, there is an age limit for entitlements to standard student grants and loans. In other countries, the means testing of such support on students' assets is likely to limit the availability of any support to adult students.

The shorter remaining length of the working life for adult workers also implies a compression of the period to amortise the investment costs associated with such programmes. Pursuing long formal education programmes would tend to reduce even further the period in which the benefits from such investment can be enjoyed. Even if such education contributes to an extension of the period until retirement, the short remaining working life is likely to be a greater disincentive for human capital acquisition with age, and can eventually eliminate all financial gains from such investment.

To illustrate the combined impact of the various individual effects discussed above on incentives facing mature adults, Table V.3 presents

19. For example, a 40-year-old male with upper-secondary education earns from around 50 per cent (in Sweden) to around 90 per cent (in the United States) more than his counterpart in his early twenties.

stylised internal rates of return to standard first-degree university education for a male starting studies at the ages of 40, 45 and 50.²⁰ The table shows clearly that under prevailing policies private incentives to increase human capital diminish with age. By the age of 40 the internal rate of return to tertiary education is considerably lower on average than that shown in Table V.1 for young men undertaking such studies as a part of their initial education (excluding student support). The drop in returns accelerates after the age of 40, the rate falling by 10 percentage points on average in the ten years up to the age of 50. Indeed, on the assumptions used for the calculations, by the age of 50 only the United States and the United Kingdom offer a positive rate of return to tertiary education. Adult participation in formal education would be stimulated if programmes could be designed in a way that reduces the high opportunity cost for older workers to participate, *e.g.* through greater use of intensive or modular courses, or if benefits could be increased, *e.g.* through longer working lives.

Table V.3. **Private internal rates of return to tertiary education for older adults (men)**

Per cent

	Age 40	Age 45	Age 50
United States	8.9	6.7	3.5
Japan	0.9	-3.0	-10.5
Germany	-1.5	-9.7	-23.0
France	7.3	1.9	-11.4
Italy	0.4	-4.1	-21.6
United Kingdom	11.1	8.8	5.5
Canada	1.0	-3.0	-10.5
Sweden	3.9	0.6	-7.5

Note: The internal rates of return to tertiary education are calculated by comparing the benefits and costs with those of upper-secondary education
Sources and Methods: see Blöndal *et al.* (2001).

20. All the calculations assume that the wage premia at the end of study are identical to those received by a young male finishing his degree as a part of initial education, and that they evolve over time in line with those for a young graduate. The length of study is assumed to be identical to that for young persons, and adult students are assumed to have no public grants or loans.

Incentives for employers to invest in training

Employer-sponsored training appears to increase profits while also inducing higher wages

The principal incentive for firms to spend on training is that such activity may increase profits. Training will increase profits if it results in sizeable productivity gains and if the productivity gains are not fully appropriated by the trained workers in the form of higher wages. The wage response may depend on the nature of the training in question. On the one hand, training in firm-specific skills is unlikely to result in higher wages as the acquired skills are not readily exportable to other firms. On the other hand, training in general skills raises the risk of the productivity gains being appropriated by the trained workers as their value to other employers has risen and the resultant threat of “poaching” may force the employer who sponsored the training to increase wages. However, even if training involves the acquisition of general as well as firm-specific skills, as often appears to be the case, there are various mechanisms that can reduce the risk of “poaching” and introduce an element of cost-sharing between firm and worker. The relationship between firm-sponsored training and profits can thus only be determined on the basis of empirical analysis.

The evidence available suggests that training tends to increase productivity, wages and profits. For example, a recent study based on UK data suggests that a 5 percentage point increase in training incidence could lead to an increase in the level of labour productivity by 4 per cent (see Dearden *et al.*, 2000).²¹ An OECD (1999) econometric study that controls for a wide range of individuals’ characteristics has identified the important influence of training on wage determination in many countries, confirming results obtained in national studies.²² The few studies that look at the impact of training on productivity and wages jointly suggest that training has strong positive effects on profits.²³ To the extent that these studies are representative, their findings suggest that employer-sponsored training is profitable and that employers have an incentive to offer training to their employees.

Many countries have policies aimed at increasing enterprise

However, concerns about a chronic lack of supply of enterprise training have prompted governments to intervene in the training market. Such interventions have included requirements that employers spend a certain proportion of their wage bill on training and giving employees the

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21. Other studies finding significant impacts of training on firm productivity include Holzer *et al.* (1993) for the United States, De Koning (1994) for the Netherlands, Alba-Ramirez (1994) for Spain, and Barrett and O’Connell (1998) for Ireland.
 22. The OECD study detected a robust “genuine” wage premium related to company training in Australia, Canada, Germany and Britain, but such training effects on wages were not found in France and Italy. National studies reviewed in OECD (1999) are in line with these findings.
 23. Thus, Barron *et al.* (1989) show that a 10 per cent increase in training in US companies is associated with a 3 per cent increase in labour productivity and only a 1½ per cent increase in wages. Also, Dearden *et al.* (2000) find that a 1 percentage point increase in the incidence of training in the United Kingdom implies a fall in unit labour costs of ½ percentage point.

training

right to training:

- *Mandatory spending on training.* In France, companies with ten or more employees have to spend a minimum of 1.5 per cent of their wage bill on training, or pay a corresponding levy. Most of the programmes target the already well-educated, and workers in large enterprise have a higher access rate to training than workers in small and medium-sized enterprise. Korea and Australia both had similar training levies in place in the 1990s, but they have now been abolished. An assessment of the levy in Australia suggested that it had increased spending on training, but, as seems to have been the case in Korea, had not been effective in stimulating such activity in small and medium-sized enterprises that preferred to pay the levy rather than spend on training. As in France, the Australian levy also left the distribution of training across different categories of workers relatively unchanged, as most of the training went to higher educated and more skilled workers, as it does in the absence of a levy.
- *Employees' rights to be trained.* France, Belgium and Denmark grant workers a right to paid training leave under certain conditions. This option puts the onus on the individual, rather than the firm, to choose to be trained, and to choose the type of training. In France, beneficiaries of the programme must have an indefinite work contract, thereby excluding temporary workers, while in Belgium the scheme is restricted to full-time workers.

Reflecting the limited evaluation available of these schemes, it is uncertain to what extent such measures have been successful in increasing gainful adult training for individuals and society.

Equity in post-compulsory education

The element of choice raises particular equity issues in post-compulsory education

In the compulsory phase of education, participation is by definition near-universal, and equity issues arise over the extent to which such participation realises the potential of all, regardless of social background or circumstances (see Box). In post-compulsory education, the equity issues arise in quite different form because of the extent of individual variation in participation. Two such issues addressed below are: (i) the extent to which the expansion of post-compulsory education has enhanced equality of opportunities to access; and (ii) the distribution of costs and benefits of public spending on post-compulsory education.

The dimensions of educational equity

The central goal of education and training is to ensure that all individuals develop to their full potential. A realisation of this goal would not remove differences between individuals in educational achievement and the associated benefits. It would not necessarily mean access for all to the same educational and training experiences but would imply access to skill development that would enable each individual to develop his or her full potential. In practice, it will often be unclear whether differences in educational outcomes reflect variation in “full potential” or differentially effective provisions.

Consideration of equity in education must address outcomes as well as access. The question to be addressed is not whether outcomes vary but whether they do to an extent that is unreasonable and whether the distributions of outcomes are equivalent in groups between which it is not reasonable to expect differences. For example, it is generally accepted in OECD countries that no factors (genetic, social or cultural) should automatically constrain female educational achievement to a different level or distribution from that of men and many countries have increased female achievement to match or go beyond that of males.

Socio-economic equity raises different issues. General cognitive abilities are significantly heritable, and these genetic effects are sustained throughout life (McLearn *et al.*, 1997). To the extent that innate abilities determine the educational attainment and socio-economic level of parents, and are genetically linked to the capacities of their children, success in one generation will be correlated with that of the next. However, the evidence suggests that socio-economic privilege confers many direct benefits, both through a home culture which tends to reinforce the goals of formal education and through the capacity to fund access to education in private schools and post-compulsory education (Dearden, 1998; McPherson and Schapiro, 2000).

Particularly in the post-compulsory phase, systems of educational finance also have an impact on outcomes by virtue of how they distribute the costs of human capital investment between different parties. Overall outcomes for any individual depend not only on the benefits of educational attainment, but also on how much of the cost of that education falls on the individuals who benefit or their families.

Expansion of post-compulsory education and the equality of opportunity

Despite the expansion of post-compulsory education...

Over the past 30 years both participation and attainment rates in post-compulsory education have increased rapidly. Thus, on average in OECD countries, nearly three quarters of the younger cohort aged 25-34 have completed upper-secondary education, and one quarter have completed tertiary education. Conversely, among those currently aged 55-64, under half have completed the upper-secondary phase of education, and only one in seven has completed tertiary education. Much of the progress is attributable to women catching up with men -- the attainment levels of younger men and women aged 25-34 are now very similar.

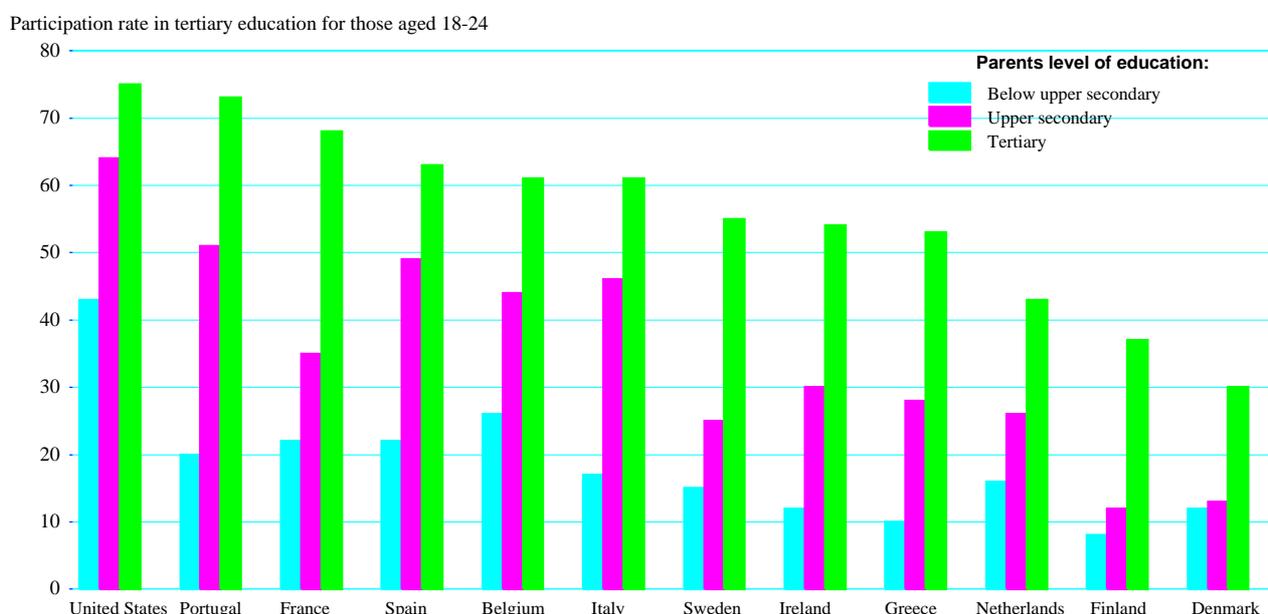
... educational attainment remains linked to parental

However, evidence from a number of countries, including the United States, the United Kingdom and France, suggests that the minority of young people who fail to complete upper-secondary education tends to

achievements...

come from less affluent backgrounds.²⁴ Moreover, the participation of young people in tertiary education is highly correlated with the educational attainment of their parents (Figure V.3). In many countries, those whose parents have completed some tertiary education are about twice as likely to participate in tertiary education as those whose parents lack upper-secondary education qualifications. These differences are unlikely to reflect purely hereditary influences. New research (OECD 2001*d*, forthcoming) shows that in the compulsory phase of education, the relationship between socio-economic backgrounds and educational achievement varies in strength across OECD countries which again may be reflected at the post-compulsory level.

Figure V.3. The influence of parental education on tertiary participation in 1994-95



Note: Overall participation rates cannot be inferred from this figure since the reported participation rates refer only to those aged 18-24.
Sources: EURYDICE (1997), Key Data on Education in the European Union 1997 European Communities, Luxembourg; U.S. Bureau of the Census (1995), Social and Economic Characteristics of the Population: School Enrolment, October 1994, Current Population Reports, Series P-20, Table 17. National surveys in Denmark, Finland and Sweden.

24. In France in the late 1990s, 62 per cent of the 15-year-olds coming from the poorest two deciles of families have had to repeat at least one year in school compared with 17 per cent from the richest two deciles (INSEE, 2000). In the United States in 1999, over three-quarters of high-school drop-outs came from families with below median income, and only 8 per cent from the highest family income quartile (National Center for Education Statistics, 2000). In the United Kingdom in the late 1990s, young people from households headed by a professional and managerial worker were twice as likely to remain in full-time education at 18 as those from households headed by an unskilled manual worker (UK Department for Education and Employment, 2000). The links between childhood experiences and educational attainment are analysed in Gregg and Machin (2001) for Britain and in Büchel *et al.* (2001) for Germany.

... and to school influence

School influence is another major, though not independent, determinant of participation at post-compulsory level. In most countries tertiary education requires prior qualifications -- generally at upper-secondary level -- so that attainment in the compulsory phase of education, as much as anything which occurs subsequently, is a key to tertiary participation. Therefore, the expansion of capacity at the tertiary level will not in itself have much impact on these factors. The challenge to public policy of delivering equality of opportunity in tertiary education is sizeable, and falls not only on the system for tertiary education itself, but also on support for children and their families, reaching back to pre-schooling and into compulsory and upper-secondary schooling.

The distribution of the costs and benefits of public post-compulsory education spending

Financing arrangements for post-compulsory education are regressive

Financing arrangements for public funding of post-compulsory education appear to be regressive.²⁵ University graduates, typically from favoured backgrounds and with high income prospects, receive large government subsidies with some social returns attached to them. However, those terminating studies after the end of compulsory schooling do not benefit from such subsidies. Indeed, it can be estimated that, on average in OECD countries, individuals with tertiary qualifications receive a gross transfer from public funds of about \$50 000, taking into account the public financing of tuition as well as student grants and loans.²⁶ Individuals in an intermediate group whose highest qualification is upper-secondary -- about half the cohort -- receive a transfer from public funds of about \$18 000. The worst-off group -- those who drop out of school at the compulsory school-leaving age -- do not obtain such transfers.²⁷ However, in the context of a progressive tax system, such regressiveness may merely act to limit the net transfer of resources from the richer to the poorer segments of society that is embedded in the overall tax-transfer system.

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25. This regressive nature of the financing of post-compulsory education would be accentuated if an account were to be taken of non-economic benefits associated with education.
26. In OECD countries, the average tuition cost of a tertiary qualification is \$35 000, with 80 per cent coming from public funds. In addition, student grants and loans represent about 17 per cent of total government expenditure on tertiary education. The net result is a transfer from public funds to the graduate of about \$35 000. On the premise that schooling is compulsory up to the 16th birthday, and upper-secondary education typically lasts until age 18, it can be assumed that a tertiary graduate has also benefited from three years of upper-secondary education, with the average transfer of public funds estimated at \$6 000 per year -- yielding a separate transfer of about \$18 000. The total subsidy to tertiary graduates is therefore about \$50 000. See OECD (2001c) for more details.
27. The regressive nature of funding arrangements in tertiary education has been recognised for many years. For an early analysis, see Hansen and Weisbrod (1969).

Participation in tertiary education does not appear to fall with higher tuition fees when accompanied by greater availability of student loans...

If public funding for tertiary education were to be cut to reduce this regressive transfer from public funds, there would be a risk that participation in such education might fall. However, the limited direct experience of changes in public funding arrangements suggests that the impact on student numbers is likely to be relatively small:

- In the United Kingdom, the replacement of grants by loans and the introduction of tuition fees in the 1990s had no obvious effect on participation rates (UCAS, 2000).
- In New Zealand, the replacement of grants by a loan system in 1992 had no marked observable effect on the growth rate of participation in tertiary education (New Zealand Ministry of Education, 2001).
- In Australia, according to one study, the introduction of tuition fees in 1989 reduced applications by school leavers by 14 per cent below what they would otherwise have been, but did not affect application rates by older applicants (Andrew, 1997). However, another study suggested that tuition fees have had no discernible negative effects on student enrolment (Vossensteyn and Canton, 2001).

As for possible adverse effects on particular groups, policy has sought to minimise such negative effects on access by students from disadvantaged backgrounds.²⁸ In many cases, loan and fee regimes have been introduced with elements of means-testing, and loan arrangements are often structured so that the lifetime repayments are lower for graduates with lower incomes and/or do not begin until graduate incomes exceed a set threshold in the future. Experience to date suggests limited effects on access by disadvantaged groups:

- In the United Kingdom, the replacement of grants by loans and the introduction of tuition fees has left the social class mix of entrants to universities unchanged, and the proportion of ethnic minority entrants and women slightly higher than before (UCAS, 2000). The take-up of student loans has been approximately equal across students from more and less affluent backgrounds.
- In New Zealand, despite the introduction of a loan scheme in 1992 and substantial fee increases, Maori and Pacific Island groups increased their participation rates substantially (by 24 per cent and 28 per cent, respectively, between 1994 and 1998) (New Zealand Ministry of Education, 1999).

28. To the extent that potential students from disadvantaged backgrounds have less information about the net lifetime gains of education or that they are particularly adverse to going into debt, an increase in fees, even if accompanied by greater loan availability, could depress their participation in higher education.

- In 1974, Australia abolished tuition fees and introduced income support measures for all students in an attempt to widen access. A number of studies have shown that the socio-economic mix of students in universities was little changed as a result (Committee on Higher Education Funding, 1998). Nor did the socio-economic mix of students change following the re-introduction of tuition fees in 1989 based on an income contingent loan, or following the more recent increase and differentiation in fees (Vossensteyn and Canton, 2001).

... and such policies may advance equity objectives without compromising efficiency goals

The limited evidence reviewed above suggests that the simultaneous increase in tuition fees and an expansion of student loan arrangements might advance equity objectives without compromising efficiency goals. An increase in tuition fees would reduce the regressive nature of financial arrangements in post-compulsory education, while the greater availability of student loans would act to offset the impact of increased private costs on enrolment. At the same time, easier access to student loans, even without a subsidy element, may be particularly important for young people from disadvantaged backgrounds, improving opportunities for all individuals to develop to their full potential.

Bibliography

- ALBA-RAMIREZ, A. (1994), "Formal training, temporary contracts, productivity and wages in Spain", *Oxford Bulletin of Economics and Statistics*, Vol. 56.
- ALESSIE, R. and A. KAPTEYN (2001), "New data for understanding saving", *Oxford Review of Economic Policy*, Vol. 17.
- ANDREWS, L. (1997), *The effects of HECS on interest in undertaking higher education*, Department for Employment, Education, Training and Youth Affairs, Canberra.
- BARCEINAS-PARADES, F., J. OLIVIER-ALONSO, J.L. RAYMOND-BARA, J.L. ROING-SABATÉ and B.A. WEBER (2000), "Unemployment and returns to education in Europe", *Universitat Autònoma de Barcelona Working Paper*.
- BARRETT, A. and P. O'CONNELL (1998), "Does training generally work? The returns to in-company training", *Centre for Economic Policy Research Discussion Paper*, No. 1879.
- BARRON, J.M., D.A. BLACK and M.A. LOEWENSTEIN (1989), "Job matching and on-the-job training", *Journal of Labour Economics*, Vol. 7.
- BASSANINI, S. and S. SCARPETTA (2001), "Does human capital matter for growth in OECD countries? Evidence from pooled mean-group estimates", *OECD Economics Department Working Papers*, No. 282.
- BEDARD, K. (2001), "Human capital versus signaling models: university access and high school dropouts", *Journal of Political Economy*, Vol. 109.
- BLAU, F. and L. KAHN (2000), "Gender differences in pay", *Journal of Economic Perspectives*, Vol. 14.
- BLÖNDAL, S., S. FIELD, N. GIROUARD and A. WAGNER (2001), "Investment in human capital through post-compulsory education and training: Selected efficiency and equity aspects", *OECD Economics Department Working Papers* (forthcoming).
- BRUNELLO, G. (2001), "Unemployment, education and earnings growth", *University of Padova Discussion paper*, 12A, No. 311.
- BÜCHEL, F., J.R. FRICK, P. KRAUSE and G.G. WAGNER (2001), "The impact of poverty on children's school attendance", in K. Vlerminckx and T.M. Smeeding (eds.), *Child Well-Being, Child Poverty and*

Child Policy in Modern Nations, The Policy Press.

CARD, D. (1999), "The causal effect of education on earnings", in O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics*, Vol. 3, North Holland.

CARD, D. (2000), "Estimating the return to schooling: progress on some persistent econometric problems", *National Bureau of Economic Research, Working Paper No. 7769*.

COMMITTEE ON HIGHER EDUCATION FUNDING (1998), *Report of the Committee on Higher Education Funding*, Australian Government Publishing Service.

DE KONING, J. (1994), "Evaluating training at the company level", in R. McNabb and K. Whitfield (eds.), *The Market for Training*, Aldershot Avebury.

DEARDEN, L. (1998), "Ability, family, education and earnings in Britain", *Institute of Fiscal Studies, Working Paper No. 14*.

DEARDEN, L., H. REED and J. VAN REENEN (2000), "Who gains when workers train? Training and corporate productivity in a panel of British industries", *Centre for Economic Policy Research Discussion Paper No. 2486*.

GREGG, P. and S. MACHIN (2001), "Childhood experiences, educational attainment and adult labour market performance", in K. Vlerminckx and T.M. Smeeding (eds.), *Child Well-Being, Child Poverty and Child Policy in Modern Nations*, The Policy Press.

HANSEN, W.L. and B.A. WEISBROD (1969), "The distribution of costs and direct benefits of public higher education: the case of California", *Journal of Human Resources*, Vol. 4.

HARMON, C., I. WALKER and N. WESTERGAARD-NIELSEN (2001), "Introduction" in C. Harmon *et. al.* (eds.), *Education and Earnings in Europe - A Cross Country Analysis of the Returns to Education*, Cheltenham.

HOLZER, H., R. BLOCK, M. CHEATHAM and J. KNOTT (1993), "Are training subsidies for firms effective? The Michigan experience", *Industrial and Labor Relations Review*, Vol. 46.

INSEE (INSTITUT NATIONAL DE LA STATISTIQUE ET DES ÉTUDES ÉCONOMIQUES) (2000), *France: portrait social*, Paris.

McLEARN, G.E., B. JOHANSSON, S. BERG, N.L. PEDERSON, F. AHERN, S.A. PETRILL and R. PLOMIN (1997), "Substantial genetic influence on cognitive abilities in twins 80+ years old", *Science*, No. 276.

- McPHERSON, M. and M.O. SCHAPIRO (2000), "Financing lifelong learning, trends and patterns of participation and financing in US higher education", *Journal of the Programme on Institutional Management in Higher Education - Higher Education Management*, Vol. 2, No. 1, Paris.
- NATIONAL CENTER FOR EDUCATION STATISTICS (2000), *The Condition of Education 2000*, Washington DC.
- NEW ZEALAND MINISTRY OF EDUCATION (1999), *Student Loan Scheme Report*, Wellington.
- O'DONOGHUE, C. (1999), "Estimating the rate of return to education using microsimulation", *The Economic and Social Review*, Vol. 30, No. 3.
- OECD (1997), *Implementing the OECD Jobs Strategy - Member Countries' Experience*, Paris.
- OECD (1998), *Human Capital Investment - An International Comparison*, Paris.
- OECD (1999), *Employment Outlook*, Paris.
- OECD (2000), *Education at a Glance - OECD Indicators*, Paris.
- OECD (2001a), *OECD Growth Project Background Papers 1, 2 and 3*, Paris.
- OECD (2001b), *The Well-Being of Nations*, Paris.
- OECD (2001c), *Education at a Glance - OECD Indicators*, Paris.
- OECD (2001d), *PISA 2000, The First Report*, Paris, forthcoming.
- RAMIREZ, J.V. (2001), "Age and schooling vintage effects on wage profiles in Switzerland", University of Geneva, Department of Economics, *mimeo*.
- UCAS (2000), *Statistical Bulletin on Widening Participation*, Cheltenham.
- UK DEPARTMENT OF EDUCATION AND EMPLOYMENT (2000a), *The Excellence Challenge*, London.
- VOSSSENSTEYN, H. and E. CANTON (2001), "Tuition fees and accessibility: the Australian HECS", in S. Uitgevers (ed.), *Higher Education Reform: Getting the Incentive Right*, The Hague.