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**MEASURING THE QUALITY
OF EDUCATIONAL OUTPUTS: A NOTE**

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ABSTRACT

This paper contrasts the approach to the measurement of stocks of education that is adopted by growth economists on the one hand and governments wishing to improve economic performance through education on the other. It is pointed out that progress to date in demonstrating the link between human capital investment and economic growth for a range of countries world-wide has been disappointing.

It is suggested that more precise measurement methods in compiling the datasets used by growth economists might contribute to research in this area. In the same way, the needs of governments monitoring the performance of their own country against those of others require a reformulated approach. To meet the needs of the latter group, data on educational qualifications will need to be collected in a more consistent manner in the different countries and adjustments made to take into account different types of certification. Inconsistencies in the current methods probably lead to a group of countries in which real outputs are understated. A more rigorous and tightly-defined taxonomy should be developed in succession to the ISCED to form the framework for qualitative comparisons. Decisions about the allocation of qualifications to a revised framework should be based on agreed measures of quality. Detailed information and qualitative data on inputs to qualifications need to be assembled, scrutinised and analysed to permit the construction of such measures.

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The first draft of this Note was written to highlight and discuss problems arising from the 1993 edition of OECD Indicators *Education at a Glance*. The note was circulated for comment to a number of experts and amended in the light of their comments. Since then, a further edition of *Education at a Glance* (1995) has been published and further drafts were therefore updated to take account of relevant changes in the 1995 edition. Detailed and helpful comments were received on later drafts from a number of sources, in particular from the Analytical Services Branch of the Department for Education. This paper has been amended in the light of those comments. Thanks are due to Anne West, Centre for Educational Research, LSE, Nicholas Oulton, NIESR and Allan Nordin, Statistics Sweden for help and encouragement. Errors are of course my own.

MEASURING THE QUALITY OF EDUCATIONAL OUTPUTS: A NOTE

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Introduction

The aim of this note is to contribute to discussion of how measurement of the quality of educational outputs might be improved. Section 1 provides a brief review of the background to the recent increase in interest in the measurement of educational outputs and Section 2 examines important differences in the way individual countries define and collect data on qualifications. Section 3 reviews the appropriateness of the International Standard Classification of Education (ISCED) framework as the basis for classification of data on qualifications and illustrates the difficulties that arise from use of ISCED with reference to *Education at a Glance* (OECD, 1995) and *Education across the European Union* (EUROSTAT, 1995). Section 4 proposes further ways of assessing quality of educational outputs and is followed by a brief summary.

1. Current Approaches to the Measurement of Educational Outputs in Growth Economics

The last ten years have seen renewed interest on the part of economists in investigating the determinants of economic growth. (Romer, 1986; Lucas, 1988; Rebelo, 1991). In particular, more recent theory has sought to establish a significant role for human capital in determining the rate of economic growth. This has led in turn to a renewal of efforts by economists to measure the human capital resources of given countries or geographical areas.

Inevitably, this has proved a time-consuming and difficult task. Economists working in this field are principally interested in gathering a large number of observations over time and over a large number of countries in order to apply sophisticated econometric analysis to the data on human capital. It may be too crude to summarise the requirements of economists in this field as 'quantity not quality', nevertheless, the assembling of a sufficient number of observations over time for as many countries as possible is a prime objective of such studies. Development economists pioneered early efforts to construct education data sets which could be used to compare measures of education across a range of countries. Lee and Psacharopolous (1979) give an account of these attempts and conclude that, especially in the case of developed countries, the lack of an established link between e.g. enrolment rates and economic growth probably results from the failure to measure and compare the quality of education outputs. Data sets relating to education in a large number of countries over a continuous time span were subsequently constructed by Psacharopolous and Ariagada (1986). Seeking to

improve on the use of enrolment rates as an indicator of human capital, this study took as the essential building blocks or unit of measurement, years of education. This approach had the disadvantage of failing to differentiate between the value of years of education at different levels of the education system. In this, and in a number of other respects, the work of Barro and Lee (1993) represents an advance in refinement in educational measurement across a large number of countries in that they do not merely estimate stocks of total years of education of the population but distinguish between years spent at different levels of the education system and, in the case of a subset of countries, between incomplete primary and complete primary and between incomplete secondary and complete secondary education.

Barro and Lee make clear the limitations of their data arising from fundamental problems of missing or unreliable observations. They also refer to unreliability of data collection methods in a number of countries and to problems arising from reliance on country data collected by non-standardised methods. However, an implicit assumption of the Barro and Lee work is that education designated by a country as being at a given *level* of the educational structure can be assumed to result in a similar degree of accumulation of human capital in each country. Increasingly, however, education and training in industrialised countries is characterised by diversification of the school population at around age 15/16 into different tracks with different goals and outputs. Barro and Lee do not seriously question the assumption made in their work that the *quality* of education at the same level across countries can be considered comparable (Sala-I-Martin and Mulligan, 1995).

Among economists investigating economic growth, there has, as yet, been little success in conclusively showing the significance of the part played by human capital. While Mankiw et al (1992) and Barro (1991) have found human capital variables significant in cross-country regressions, DeLong and Summers (1991) claim that once equipment investment is taken into account, other variables, including human capital, add little explanatory power. Oulton and Young (1996) also found that neither the level nor the growth rate of the Barro-Lee 'years of education' was significant in explaining the growth rate of GDP.

One reason why the human capital variable has not been shown to have more significance in such models may be that methods of measurement are still not sufficiently sophisticated to capture the crucial differences between different countries' stocks. More recent work (Hanushek and Kim 1995; Sala-I-Martin and Mulligan, 1995) takes up the challenge of attempting to capture quality differences both within and between countries in stocks of human capital. Hanushek and Kim propose a measure of human capital which involves weighting school enrolment data by a factor derived from the results of the International Evaluation of Educational Achievement surveys carried out at intervals since 1961. Sala-I-Martin and Mulligan use prices (wage data at different points in time by educational level

in different US states) as a proxy for skills. Gemmell (1995) criticizes previous work including that of Barro (op.cit.) for using school enrolment rates as a proxy both for stocks of and investments in human capital. Gemmell proposes a human capital measure which is capable of distinguishing between stocks and flows (although, he is obliged by lack of data on stocks by educational level to use enrolment rates in 1960 as a proxy for stocks). Unlike Sala-I-Martin and Mulligan, and Hanushek and Kim, Gemmell does not address the question of quality differences at given levels of education although he does distinguish enrolments by level - primary, secondary and tertiary. It is not the aim of this paper to evaluate the overall validity of these studies, but it is interesting to note that both Hanushek and Kim and Gemmell claim to have detected a stronger relationship between growth and the indicator used for human capital than had been found in studies using a simpler measure.

Measurements of the Output of Educational Provision

Quality differences assume particular importance when we consider the growth in demand for the measurement of human capital from a different source and for a different purpose, namely the demand from governments for a means of assessing and comparing internationally the performance of publicly-funded systems of education by means of a comparison of their outputs. In OECD countries interest in such comparisons has increased at the same time as interest in comparing the outputs of the education system *within* countries - between schools, local authorities etc. has grown. A common factor is increasing and conflicting pressure for increases in public spending from a variety of constituencies. Intra-country comparisons help to identify the extent to which some parts of provision are under-performing. However, with intensifying global competition, governments now consider that performance of educational provision in line with an internally-determined norm is no longer a satisfactory measure of efficiency and effectiveness. Inter-country comparisons based on measured outputs are also required to determine whether the standard achieved is the optimum possible. The two are related to the extent that both stem from a desire to ensure that resources devoted to education are used in such a way as to produce the optimum outcomes. Large-scale inward investors also carry out careful skills audits in the countries under consideration as possible location investments and the results of inter-country comparisons of educated labour stocks are also recognised by national governments as important in negotiations about inward investment.

Both economists and governments are, therefore, broadly speaking, working within the same paradigm in their concern with the measurement of human capital, since in both cases interest in educational outputs arises from structural changes in the functioning of world markets (more intense global competition) allied to technological change in the production of goods and services which requires a

more highly educated labour force. However, in practice their interests and approach diverge - growth economists are concerned principally with human capital as an *input*, that is, one among a number of factors affecting economic growth. Until now, they have had little interest in how (efficiently or inefficiently) those inputs have been produced. Governments and policy makers view stocks of human capital as *outputs* of educational provision and their questions largely concern relative efficiency in the way resources devoted to education are used. The comparison of quality of the outputs of different patterns of educational provision is essential to the internal and international skills audits sponsored by or carried out by governments. Many of the approaches to the measurement of human capital adopted by growth economists will therefore be too crude for skills audit purposes. The use of prices as a proxy in international comparisons across diverse labour markets nationally segmented does not, for example, seem to offer a useful approach for efficiency studies. However, as the earlier part of this section indicates, growth economists are increasingly interested in refining stocks and flows data by reference to measures of relative quality and it is at this interface that the two different exercises may have a common interest in the refining of data measurement of stocks and flows of education.

The diversification of the output of the educational system at the higher levels (upper secondary and tertiary education) mentioned above has made inter-country comparisons a more complex undertaking. Qualitative differences in the attainments of different groups of students at the upper levels of the educational structure are, however, of prime importance to governments anxious to ascertain how far the investment they are making from the public purse in the education and training of young people is producing skills and knowledge which will enable their manufacturers and businesses to remain competitive.

Once a concern for the quality of a *diversified range* of outputs from education and training systems has been introduced, many of the standard tools and procedures that had served a useful purpose in an earlier age prove to be ill-adapted to new demands. This is particularly the case with the methods used by a number of countries to collect data on stocks of qualifications in the population and with existing taxonomies of educational levels (ISCED). These problems are discussed in Sections 2 and 3.

2. The Definition of Education Outputs and Data Collection in OECD Countries

As governments become more concerned about maximising the return on public expenditure on education, the demand for international comparisons of educational outputs increases. However, the national surveys which produce this data were not designed with such comparisons as their primary purpose. In this

section, we shall consider the extent to which the collection of data and the reporting of outcomes of education and training varies between countries, and the effect that this has on the value of comparisons.

Information regarding the highest educational qualification held by individuals in the population or in the workforce is collected in most OECD countries by means of a sample survey carried out annually or biannually by government.¹ The information that can be retrieved from such surveys is limited to that elicited by the survey questionnaire and coded up for entry to the database. For the questions on highest qualification held in these surveys, practice varies in important respects between countries. Four principal differences are listed below and their frequency recorded in Table 1.

a) Only State Validated Qualifications Reported

A majority of countries only ask for and record information about qualifications accorded State validation. To my knowledge, this is the practice in French-speaking Belgium, France, Italy and Spain - it may well be the case for a number of other OECD countries also. This does not mean that the qualifications must have been awarded in publicly-financed educational institutions, but it does mean that - where private bodies have provided the education or training leading to the examination or assessment - in order to be recorded, the final qualification awarded must be one validated by the State.

In the UK, a less rigid distinction is maintained between qualifications which have the authority of some sort of government quality control (validation or accreditation - the GCSE and GCE A-level examinations in England for example) and those offered and regulated by quasi-private bodies. Consequently, the questions asked by interviewers in the UK encompass a far wider range of qualifications, both publicly and privately regulated and awarded than in other countries.

b) Only Qualifications Awarded Within the Educational System Reported

The reporting of qualifications in countries such as Belgium and Italy, is further constrained by restricting reporting to those institutions which come under the administrative control of the Ministry of Education and excluding qualifications awarded under the auspices of other Ministries, for example the Ministry of Labour or by regional authorities.

This difference in scope of information collected helps to explain the low figure in Belgium for the percentage of the population holding a post-compulsory qualification or higher level qualification - only 45 per cent compared to 82 per cent in Germany (OECD, 1995). A closer scrutiny of the Belgian Labour Force Survey reveals, however, that only data on qualifications awarded within the initial schooling system and regulated by the Ministry of Education are counted in that

survey. Most vocational training takes place outside that framework, and the very considerable number of qualifications awarded as a result are not recorded in the Labour Force Survey.²

The conclusion is, therefore, that in a number of OECD countries there is considerable under-reporting of qualifications obtained. In particular, this under-reporting affects vocational qualifications - other examples similar to Belgium are Italy (where vocational training is administered by the Regions), and Spain.

c) Differences in Basis for Award of School-leaving and Other Qualifications

Another fundamental difference arises from the way in which qualifications are awarded. In a number of OECD countries, Sweden, the USA and Germany, for example, the award of the upper secondary school or High School leaving diploma is made almost entirely on the basis of assessments set and marked in the individual school or college by teachers. Germany is a rather different case, since there is initial selection onto the *Abitur*, considerable attrition *en route* and some failure in the final stage. German regional education authorities monitor closely the standard of tests set and moderate the assessment process. Consequently, students are judged against a single standard and failure occurs, although not frequently.

In Sweden and the USA, almost all students who complete the course of study are awarded the leaving certificate or diploma and it is the possession of this diploma which distinguishes the holder of an ISCED Level 3 qualification from a non-holder. However, students in these countries gaining a final school-leaving diploma are not judged against a single standard but against a hierarchical range of standards: the range of standards against which students are judged for the award of a High School Diploma in the USA, for example, extends from something like a grade F/G at our GCSE to something approaching A-level.

In another group of countries, which includes the UK, France and Italy, school-leaving qualifications at a number of levels are awarded on the basis of externally set and marked written examinations. Failure rates are in the region of 25-30 per cent. While some of these examinations (for example the GCSE) may attest to a range of achievement, this is usually denoted by a grade. The UK Labour Force Survey distinguishes between GCSE certificates at grades A-C and certificates at other grades.

d) Grouped Examinations and Single Subject Examination Passes

In the UK, all the principal national examinations, the CSE, O-level and A-level examinations are single subject examinations and, until very recently, any individual holding one or more O-levels was included in e.g. the 'some O-levels' category, alongside those who had passed in 8 or 10 subjects. The same is still true for A-level passes. In contrast to this rather inclusive way of counting qualifications held by the population, countries such as France, Italy and Germany,

for example, which have only ‘grouped examinations’ i.e. examinations in which performance is assessed across a number of subjects, most of which are mandatory, count only those who have passed the examination in every required subject. Many of those who are not counted have completed the whole course of study, and many, in the case of the C A P in France, for example, will have passed one part of the examination, for example the practical part but failed the academic test. These individuals would almost certainly have been awarded a qualification if they had been assessed on the criteria used in Sweden.

From this analysis, I conclude that there are quite serious problems of inconsistency in the collection of data in the different OECD countries that lead to under-reporting of qualifications held.

For convenience, I summarise these differences in Table 1 below.

TABLE 1

DIFFERENCES IN REPORTING OF QUALIFICATIONS BETWEEN SELECTED OECD COUNTRIES				
	Only quals awarded within formal school provision reported	Only quals assessed by external written exam reported	Only ‘grouped’ quals reported	Quals awarded by private bodies not reported
US			X	
JAP	X		X	X
UK		X		
B	X		X	X
FRA	X	X	X	X
GER		X	X	X
IT	X	X	X	X
SWE			X	

We could conclude that there is the highest degree of under-reporting in the countries with the highest X score on Table 1. This is how the X ranking lines up against ranking by OECD reports of percentage with no upper secondary education.

**TABLE 2: SCORES ON TABLE 1
AND PERCENTAGE OF THE POPULATION
WITH NO UPPER SECONDARY EDUCATION BY COUNTRY**

	SCORE		% NO UPPR
	Table 1		SEC (b)
FRA	4		48
IT	4		72
B	3		55
JAP(a)	3		33
GER	3		18
US	1		16
UK	1		32
SWE	1		30
(a) Own Calculations (b) 'OECD Education at a Glance', 1995. Table CO1(A)			

From this comparison, we can see that those countries which have very strict criteria for reporting qualifications in Labour Force Surveys tend to have relatively high proportions of the population with no upper secondary qualifications.

In the middle, we have Belgium, Germany and Japan, both with rather strict criteria but low - and in the case of Germany, very low - percentages of the population without upper secondary education. Can these levels be satisfactorily explained? In the case of Japan, the absence of an externally set and marked school leaving examination may help to explain the relatively high levels of those graduating. The criterion of those qualifying on admission examinations to the next stage of education (higher education) may be a more reliable guide to the standard of achievement at upper secondary level in Japan.

In the case of Germany, all those passing the apprenticeship examinations awarded by Chambers of Commerce have been included. Without these passes,

Germany's figure for no upper secondary education would be similar to that of France. In fact, we can easily see the effect of excluding vocational qualifications on Germany's percentage in upper secondary education by consulting the Barro and Lee dataset (Educational Attainment Data 1960-1985). For 1985, Barro and Lee give the proportion of the population in West Germany having attained (i.e. having some) secondary education as 20 per cent. This figure does not reconcile well with the figure for the same population of 60 per cent at the same level 7 years later in 1992, given in OECD 1995 Table CO1 (see Appendix). The reason for the discrepancy is that the first figure includes only academic upper secondary education while the second figure includes individuals having obtained an apprenticeship certificate. Belgium records only school qualifications.

In the case of the US, UK and Sweden, a number of criteria have been relaxed. Relative to countries at the top of the Table, we have to ask whether the figures reported for those countries are really comparable to those of countries using different criteria for the definition of educational outputs.

3. The Classification of Educational Outputs

Chief among the tools currently used for the classification of educational outputs is the International Standard Classification of Education (ISCED). The ISCED categories are as follows:

ISCED 0	Education preceding the first level (pre-primary)
ISCED 1	Education at the first level (primary)
ISCED 2	Education at the lower secondary level
ISCED 3	Education at the upper secondary level
ISCED 5	Education at the tertiary level, first stage
ISCED 6	Education at the tertiary level, first stage, leading to first degree
ISCED 7	Education at the tertiary level, second stage, leading to a post-graduate degree

The ISCED was developed by UNESCO more than twenty years ago to provide a framework for the international classification of education defined as 'organized and sustained communication designed to bring about learning'. It was originally envisaged that the classification could be used for a number of purposes, principally the classification of **courses** of education, but other uses envisaged included the classification of stocks of educated individuals in the population. (Unesco Office of Statistics, 1975)³ Despite the broad definition of education quoted above, the ISCED classifies 'courses, programmes and fields of education according to their educational content', educational content being defined as having

two dimensions - level and subject matter. It can be seen from the description above of the work carried out by Barro and Lee using the ISCED levels as the basic building blocks, that where comparisons are primarily global and quantitative, the categorisation of years of education according to ISCED level can give some useful information concerning the weighting of different years of education in the calculation of human capital accumulation. However, when advanced industrialised countries try to use the ISCED classification for a very different purpose, namely to assess the *total performance* of their educational system, the limitations of ISCED become more obvious, and the need for a revised taxonomy of educational outputs becomes apparent.⁴ Healy and Nordin (1995) have made similar points concerning the limitations of the ISCED taxonomy as a result of work for the OECD Study Group B set up to develop indicators for the domain of education and labour market destinations.

As an example of the effect of the definition of the ISCED Level 2/3 cut-off point on measurement of outputs, we can take two different definitions of ISCED 3 and contrast the results for a comparison of countries' educational outputs. Our first definition defines ISCED 3 outputs as including only those qualifications which give access to higher education. The second is more inclusive, and defines at ISCED 3 those individuals who have successfully completed at least a two year course of further education or education and training following the completion of compulsory education. For a selection of OECD countries, the strict application of the first criterion leads to the ranking of countries shown in the left hand column of Table 3 below.

TABLE 3

COUNTRY RANKINGS (PERCENTAGE HOLDING GIVEN LEVEL OF QUALIFICATION OR HIGHER IN BRACKETS) ON TWO DIFFERENT MEASURES OF POST-COMPULSORY SECONDARY EDUCATION				
1992(a)		1992(b)		
JAP (67)		US (87)		
NE (65)		NOR (83)		
NOR (58)		JAP (67)		
AUSL (50)		AUSL (65)		
US (48)		NE (65)		
SWE (43)		SWE (63)		
IT (35)		FRA (59)		
UK (32)		UK (40)		
FRA (29)		IT (35)		
SPA (11)		SP (34)		

Notes: (a) percentage of the active population holding qualifications giving access to university level education or higher qualification.
(b) percentage of the active population having successfully completed at least a two year course of further education or education and training following completion of compulsory education.

Source: Unpublished tables compiled at the Centre for Economic Performance from a variety of official publications.

The right hand column of Table 3 shows the ranking that results from using the second set of criteria for classifying upper secondary education. From Table 3, therefore, we can see that, according to the criterion used and the resulting cut-off point, the ranking of the different countries changes in a quite major way. The US, Norway and France all improve their relative positions. In particular, the US moves from 5th place to 1st place on the second ranking while France moves from 9/10th place to 7/10. These admittedly crude measures nevertheless illustrate the

sensitivity of measures of stocks of educational outcomes to the cut-off point chosen.⁵

Another example of the different rankings that can be achieved by using different cut-off points for the definition of ISCED 3 Level education can be found in the latest edition of the OECD publication *Education at a Glance* (OECD 1995).⁶

In *Education at a Glance* 1995 Annex 3 - reproduced here as Table A2 - we find the theoretical starting, ending and graduation ages at upper secondary education by type of programme. For the United Kingdom, the typical starting age of upper secondary education is given as 14, two years before the end of the compulsory period of education.⁷ Most, but not all the other countries in the Table set the beginning of upper secondary education in the year in which compulsory education ends i.e. end on to compulsory education. All the EU countries do so, except Belgium (where education is compulsory to 18) which gives 15 as the start of upper secondary education, Spain - upper secondary education given as starting at 14 with compulsory education until age 15, and Austria - upper secondary education given as starting at 14 with compulsory education until age 16.

When we turn back to the ISCED definitions, we can see that the UK is not, in fact, misinterpreting the ISCED criteria, rather, the criteria have tended not to keep pace with the development of educational structures in OECD countries. The definition of ISCED 3 is according to two criteria, first, it is envisaged as being based upon some eight years of previous schooling. With a modal starting age for education in Western Europe of 6, this stage would clearly have to start at or around age 14. Yet the other criterion is that some significant subject specialization should occur - here the definition fits most closely the education that occurs at the upper secondary stage. One possible explanation for this anomaly is that the definition was framed with developing countries in mind where primary and lower secondary education may be of a shorter duration. The UK has adhered more closely than most OECD countries to the original ISCED definition.

The differences in interpreting the ISCED 2/3 cut-off point would not have mattered too much in terms of the overall picture that it gave of the UK compared to other countries if the matter had been confined to Annex 3 (our Table A2).

However, OECD's Annex 3 forms the basis for a further table, Table CO1(A) in *Education at a Glance* - reproduced as Table A1 in this paper - which shows the percentage of the population 25-64 years of age that has completed a certain highest level of education. Completion of upper secondary education is defined as those holding the certificate attesting completion of the whole or a recognised part of that stage. Here, the UK emerges as one of the very highest qualified populations aged 25-64 in the EC of the 12, second only to Germany and well above France, Belgium and the Netherlands. This does not reconcile well with the comparisons I have carried out of workforce skills in France and the UK where France is at a similar level to Britain (Steedman, 1990).

The Office of the National Council for Education and Training Targets (NACETT) in England has calculated a figure for the workforce, not the population, qualified to A-level, (G)NVQ3 or equivalent of 37 per cent for the same year; 31 percentage points lower than the figure of 68 per cent given for the total UK population aged 25-64 in the OECD table at ISCED Level 3. Even allowing for differences of definition, (the NACETT figure excludes qualifications which do not lead to some form of higher education) the enormous disparity between these two figures looks extremely odd.

If we look more closely, we can see that much turns on the definition of upper secondary education. If you define upper secondary education in the UK as starting at 14, then O-level/GCSE can be classified as a qualification awarded in the course of upper secondary education. Whereas NACETT classifies O-level/GCSE to a category below the category containing A-level and equivalent qualifications, the UK authorities have classified O-level/GCSE to the *same* category as that containing A-level qualifications. O-level/GCSE is one of the largest categories of qualification, and shifting it from one level to another makes a lot of difference.

How have other countries treated qualifications which are obtained at the end of compulsory schooling? The accompanying Notes are uninformative and inconsistent, for example, while in the 1992 edition of *Education at a Glance*, the Notes make clear that the UK definition of ISCED Level 3 includes O-level and A-level passes, this explanation is omitted in the 1995 edition. Likewise, the Notes are not very helpful as a guide to the qualifications included at ISCED Levels 2 and 3 in France. However, it is possible to go back to French census data and to calculate that France has classified its leaving examination at the end of compulsory schooling, the BEPC, to ISCED Level 2.

The GCSE is quite unambiguously a qualification usually obtained within the compulsory period of schooling (indeed, it constitutes the assessment of the final stage of compulsory education in certain subjects). In this respect, it most closely resembles the French *Brevet*. This qualification is assigned to ISCED 2 (in Table A1). Under no circumstances does the GCSE constitute a qualification acceptable as an entry qualification to higher education (except in the very archaic sense of being a matriculation requirement).

It is therefore not possible to argue that the GCSE belongs in ISCED 3 by virtue of being a qualification widely accepted as an entry qualification to the next stage of education. My view is, therefore, that it would be more accurate to assign GCSE to ISCED 2 and to state the proportions of the population at each level in the UK as follows (OECD 1995 figure in brackets):

ISCED 1,2 Early childhood education, primary, lower secondary - 47% (32%)

ISCED 3 Upper secondary education - 34% (49%)

ISCED 5,6,7 University and non-university tertiary education - 19% (19%)

These differences are also presented below in chart form.

CHART 1

In *Education at a Glance 1995*, inconsistencies also arise between the different charts and tables which give information on the age at which UK students are considered to pass from ISCED 2 to ISCED 3.

A chart of the structure of educational provision classified to ISCED levels by age is given in Section IV of *Education at a Glance 1995*. For the UK, the chart clearly states that educational provision classified to ISCED Level 2 starts at age 11 and ends at age 16 compared to the age of 14 given in OECD's Annex 3. In the OECD's chart of educational provision, the GCSE examinations are indicated as falling within the period of provision classified to ISCED Level 2 whereas in Table A1 also from *Education at a Glance*, GCSE is allocated to ISCED 3.⁸

Annex 3 in *Education at a Glance* - our Table A2 - gives rise to further confusion. In this table we also find that for the UK the starting age of upper secondary education in England and Wales appears as 14 for general education students but 16 for vocational education students. This anomaly again arises directly from the decision by the UK to place the start of ISCED 3 at age 14. The OECD asks countries to distinguish within ISCED 3 between vocational and academic upper secondary education. The UK makes this distinction by classifying all education taking place in schools after the start of ISCED 3, as general education, and all education taking place in Further Education Colleges as vocational. Since it is not usually possible in this country to enter further education until after the end of compulsory schooling, ISCED 3 (vocational) in the UK is deemed to begin at age 16 not 14.⁹

Action appears to be required to establish the UK ISCED 2/3 cut-off point at age 16 not only for consistency with procedures adopted by other countries but also for consistency with the realities of the educational structure of the UK. The problem is particularly acute because GCSE passes are treated differently in the Statistical Office of the European Community's (EUROSTAT) yearly volume of educational statistics.¹⁰

Section E of this volume provides Tables which gives percentages of the population aged 25-59 by highest ISCED level of education attained. Table E4 is a close counterpart to Table CO1(A) of *Education at a Glance* (our Table A1) discussed above. The EUROSTAT definition of ISCED 3 is different from the UNESCO definition adopted by OECD. In the EUROSTAT definition 'data include population with attainment in general education less than ISCED 3 but with an additional vocational qualification'. This definition means that UK O-level holders are back in ISCED 2 and only those who hold a vocational qualification in addition to O-level are classified to ISCED 3. This definition gives us yet a third way of allocating the population to ISCED levels but one close to that proposed in the adjustment given above. Table 4 summarises all three allocations.

TABLE 4
UK POPULATION AGED 25-64^(a) BY HIGHEST ISCED
LEVEL OF EDUCATION ATTAINED 1992^(b)

	OECD	EUROSTAT	OWN CALC
ISCED 1,2	32	50	47
ISCED 3	49	29	34
>ISCED 3	19	21	19

(a) For EUROSTAT, aged 25-59, for OECD and OWN CALC, men aged 25-64, women aged 25-59.

(b) EUROSTAT 1993

4. Assessing the Quality of Education and Training Outputs

This paper has so far dealt primarily with the problems raised by current methods of presenting educational outputs. It is clear that procedures currently adopted by international bodies are not yet sufficiently coordinated to serve as a basis either for growth economists or for economists assessing educational efficiency in a comparative context. In this concluding section, therefore, I suggest some ways in which progress might be made towards a classification of educational qualifications based upon a combination of quality measures. The approach outlined below is based upon a number of years of experience of benchmarking intermediate vocational and general academic qualifications in Europe against their counterparts in the UK. (Steedman, 1992.)

A useful starting point in the process of establishing equivalences of qualifications across countries is the fact that all countries having some educational provision have also developed a set of generic categories in order to classify this provision. Once curricular pathways became diversified and a variety of curricula and assessment were available so that individuals gaining a given recognised qualification no longer studied the same subjects and took the same test, judgements of equivalence between subjects (e.g. between passes in different subjects at GCE A-level in Britain) had to be made. Without such judgements, the output of the educational system would have lost its usefulness as a signalling device within the education system and on labour markets. As a result, **within** most countries, there is a long-standing tradition of making judgements about equivalence of qualifications between different qualifications awarded by that country's education system.

Even where the range of coverage or the standards required in two sets of

qualifications are not identical, performance of individuals with two different sets of qualifications may still be considered similar enough for these different sets of qualifications to be bracketed together as equivalent. This happens in almost all countries, not least in Britain, where we have probably a larger range of qualifications than in any other country. Thus, in the past, equivalences have been agreed for the purposes of university entrance or for entrance to lower level courses between, in Britain, BTEC and GCE qualifications. In France, the newer Baccalaureate qualifications have been granted equivalence with the older more traditional qualification which dates from the 19th century. In the US, the GED examination is accepted within the education system (although not on the labour market) as conferring the equivalent of a High School Diploma.

The step from establishing intra-country equivalences to suggesting inter-country equivalences is a large one. Nevertheless, for advanced industrialised economies the different types of qualifications in these countries fulfill similar roles. Except at the very highest levels, almost all qualifications fulfill two purposes. First, they attest fitness to proceed to the next stage in an established cursus or level within the education and training system. Second, they are recognised by employers as signalling sets of general or specific skills required in employment. The fact is often overlooked that most advanced industrialised countries have very similar structures of educational progression and similar categorisation of qualifications with regard to labour market entry.¹¹ These categories, when found across countries, can form the basis for an analysis and comparison of qualifications themselves.

Using these generic categories as a starting point, standards of attainment of students at comparable stages of education in a variety of countries can be investigated in a number of ways. Alone, none of these are completely without methodological weakness. A way of proceeding is to draw upon evidence from all available sources and methods of comparing between countries and to see how far consistency and convergence of views on standards emerge from this process. To the extent that a judgement on standards is similar regardless of the methodology used, that judgement can be taken to be robust. This procedure is already well-known and tested in qualitative social science research and known as 'triangulation' (Miles and Huberman, 1984).

The sources on which we can draw are a) international comparisons of educational achievement; b) reports compiled by teams of experienced educationalists; c) previous published work comparing syllabuses and examination papers; d) reports commissioned from independent experts comparing examination papers.

Alone, each of these methods has weaknesses. International surveys have to contend with two major problems, first ensuring that the tests set, test at least part of the curriculum covered in the countries surveyed and that sufficient common

questions nevertheless emerge. Second, it is necessary to ensure that in each country a representative sample of the population to be surveyed is drawn and tested. All recent international surveys have been the subject of some criticism on both these counts.¹²

Reports by visiting groups of experts are inevitably limited by the number of institutions that can be visited and the amount of documentation that can be evaluated within a short time scale. Nevertheless, when such surveys are undertaken by experts (eg HMI) having a long and wide experience in their own countries, such judgements carry considerable weight. (HMI/DES 1991,1993.)

The third method, comparing examination papers taken nationally or guaranteed as being of a similar standard throughout the country, overcomes two of the problems that arise for international testing programmes. First, the curriculum tested is the one taught. Second, the students tested are a whole population and not a sample. However, curricula and therefore examinations do differ from country to country and judgments must be made about whether the questions set or the skills developed are sufficiently similar to be able to say that students are performing to similar levels.

It can be suggested to those comparing syllabuses and examinations that they ask themselves how well, in their judgement, their own pupils who have scored at a particular level on an English examination would perform on those elements of the test set by another country which are similar to those tested in their own country's examinations. They must also assess what proportion of the comparator country's examination questions their own pupils would be able to attempt. The point at which considerable overlap in respect of both measures occurs is the point at which equivalence can begin to be established. In arriving at this judgement, which must inevitably be a complex one, assessors must take into account the format of the examination, the phrasing of the questions, the examination conditions and many other factors. Because such a variety of fine judgements are involved, it is important not to base our final judgements about equivalences on these comparisons alone, but to accept equivalences when judgements already arrived at or indicated by a) and b) above have been confirmed by comparisons of papers and syllabuses.

These judgements are then considered within the wider context of

prerequisites

period of study required

reliability of assessment and examination procedures

breadth of coverage of curriculum as revealed by written examination papers

pass mark or pass rate where information available

next destination - in the labour market or in the educational system

The final judgment has to be logically consistent with, in particular, what we know

about prerequisites, next destination in education systems or next labour market destination.

Decisions as to whether an individual has reached a particular educational level or standard are rarely simple and almost always involve an element of judgement. One of the important messages to emerge from Britain's experiment with competence-based, criterion-referenced assessment is that the basis for such judgements cannot be exhaustively spelled out in advance but that the assessor must be allowed some degree of holistic judgement about overall performance. Judgements on equivalence are no exception to this rule.

We should not, however, be reluctant to attempt to set such equivalences. Comparison is one of the most basic of cognitive tools and the key to learning. We consider that the work of suggesting equivalences is a step along the road to greater understanding and deeper insight into what is being achieved by the resources devoted to education in the countries under review. For the purposes of improving methods of measuring and comparing the outputs of different countries' education provision, the methodology proposed above could lead to the development of accepted methods of weighting crude measures of years of education or stages of education completed.

Summary

This paper contrasts the approach to the measurement of stocks of education that is adopted by growth economists on the one hand and governments wishing to improve economic performance through education on the other. It is pointed out that progress to date in demonstrating the link between human capital investment and economic growth for a range of countries world-wide has been disappointing. It is suggested that more precise measurement methods in compiling the datasets used by growth economists might contribute to research in this area. In the same way, the needs of governments monitoring the performance of their own country against those of others require a reformulated approach. To meet the needs of the latter group, data on educational qualifications will need to be collected in a more consistent manner in the different countries and adjustments made to take into account different types of certification. Inconsistencies in the current methods probably lead to a group of countries in which real outputs are understated. A more rigorous and tightly-defined taxonomy should be developed in succession to the ISCED to form the framework for qualitative comparisons. Decision about the allocation of qualifications to a revised framework should be based on agreed measures of quality. Detailed information and qualitative data on inputs to qualifications needs to be assembled, scrutinised and analysed to permit the construction of such measures.

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APPENDIX

APPENDIX TABLE A1 EDUCATIONAL ATTAINMENT OF THE POPULATION

Percentage of the population 25 to 64 years of age that has attained a specific highest level of education					
	Early childhood, primary and lower secondary education	Upper secondary education	Non-university tertiary education	University education	Total
North America					
Canada	29	30	26	15	100
United States	16	53	7	24	100
Pacific Area					
Australia*	47	30	11	12	100
Japan	...	...	...	...	...
New Zealand	43	33	13	11	100
European Community					
Belgium	55	25	11	9	100
Denmark	41	40	6	13	100
France	48	36	6	10	100
Germany	18	60	10	12	100
Greece**	66	21	3	10	100
Ireland	58	25	9	8	100
Italy	72	22	x	6	100
Luxembourg	...	...	...	...	...
Netherlands	42	37	x	21	100
Portugal**	86	7	2	5	100
Spain	77	10	3	10	100
United Kingdom	32	49	8	11	100
Other Europe - OECD					
Austria	32	61	x	7	100
Finland	39	43	8	10	100
Iceland	...	...	...	...	...
Norway	21	54	13	12	100
Sweden	30	46	12	12	100
Switzerland	19	60	13	8	100
Turkey	86	9	x	5	100
Country mean	45	36	8	11	100
* 1993 data ** 1991 data					

From OECD 'Education at a Glance', *OECD Indicators*, Paris, 1995. Table C01(A).