UNIVERSITY OF OXFORD
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CONFUSING CREDENTIALS:

THE CROSS-NATIONALLY COMPARABLE MEASUREMENT OF EDUCATIONAL ATTAINMENT

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NUFFIELD COLLEGE

Submitted for the degree of Doctor of Philosophy (DPhil)
Trinity Term 2009

To my family

For what cannot be measured

The table has many gaps and, even where figures are known, they are based on such varied procedures as to lack comparability. To improve the situation much more study and compilation are needed at the international level and also a great deal of concerted action by the nations to standardize their procedures.

(UNESCO, 1955, p. 15)

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ABSTRACT

The quality of educational attainment measures lies at the heart of many cross-national micro-sociological research projects and international education statistics. This study aims at validating cross-nationally comparable measures of educational attainment, among which are the International Standard Classification of Education 1997 (ISCED 97), the CASMIN education scheme and *years of education*. Following a conceptual discussion of what educational attainment means, the most common ways of measuring educational attainment cross-nationally as well as previous evaluations thereof are reviewed. Then, the implementation of ISCED 97 in cross-national surveys is examined by looking at both the resulting educational attainment distributions in three European surveys as well as the data generation and harmonisation processes. Finally, a number of cross-national measures of educational attainment are compared with country-specific measures with respect to their information content by firstly examining the dispersion of educational attainment, and secondly the predictive power when explaining two core social stratification outcomes, occupational status and social class attainment, by educational attainment. The main results of the study are that the measurement of educational attainment in cross-national surveys is affected by a number of avoidable weaknesses which adversely affect the validity of claims based on analyses of these data: 1. Countries and surveys are inconsistent in the way they measure educational attainment and apply ISCED 97 to national data; and 2. *actual years of education* and the one-digit version of ISCED 97 distort measures of association to differing degrees in different countries. Both make cross-national comparisons using these measures highly problematic. Therefore, some amendments to the implementation of ISCED 97 in cross-national surveys and coding for statistical analyses are proposed. As part of the latter, an alternative simplification of ISCED 97, optimised for European survey research, is developed and validated. Moreover, suggestions for data collection procedures are made to improve the measurement of educational attainment nationally and cross-nationally.

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1

EDUCATIONAL ATTAINMENT IN CROSS-NATIONAL RESEARCH AND INTERNATIONAL EDUCATION STATISTICS: SETTING THE SCENE

Educational attainment is of key interest for both academic research and education policy at the national and international levels. From a macro level perspective, during the process of economic globalisation, the demand for more and better skills has increased significantly over the last decades in developed countries in the East and West. At the same time, the demand for skilled and especially unskilled manual labour has decreased substantially. The main reasons for this are the development of information technologies, increasing automation and thus increases in productivity in agriculture and manufacturing, allowing an unprecedented growth of the service sector and, finally, outsourcing of low-skilled jobs to developing countries (see e. g. Berman et al., 1994; Machin, 1996; Wood, 1994). Consequently, industrial societies are said to turn into post-industrial 'knowledge societies' (e. g. Drucker, 1969, 1993; Stehr, 1994), whereby theoretical knowledge becomes "the strategic force, an axial principle, of a society" (Bell, 1974, p. 26).

These developments had and continue to have a substantial impact on the provision of education throughout developed economies as countries need

to invest in education and training in order to be economically competitive.[1] Thereby, secondary education is close to becoming universal amongst the young in many countries, and tertiary education has been expanding substantially and is becoming increasingly differentiated. Indeed, "the university increasingly becomes the primary institution of the post-industrial society" (Bell, 1974, p. 245–246). Beyond increasing educational provision in terms of quantity, the quality and equity of the education that educational systems provide is today a key concern for policy makers (see e. g. OECD, 2008).

From a micro level perspective, education is a core asset for individuals' integration in modern society: Education provides individuals with skills and credentials that facilitate their labour market, social and cultural participation. Moreover, education is an important cause, mediator and outcome of social inequality and thus plays a decisive role in social class reproduction (Breen and Jonsson, 2005; Erikson and Jonsson, 1996). It is also an important predictor of demographic events, such as age at family formation (Blossfeld, 1995; Blossfeld and Huinink, 1991; Kritz and Gurak, 1989; Liefbroer and Corijn, 1999), health and mortality (Eikemo et al., 2008; Lleras-Muney, 2005), and migration (Long, 1973; Massey and Espinosa, 1997; Schwartz, 1976). Accordingly, it is used in a wide range of individual-level empirical studies either as a main focus (predictor or outcome variable) or as a control variable, especially in sociological research on social stratification. Educational attainment is finally also used for the production of weighting factors for survey data.

1 See e. g. the EU's Lisbon strategy adopted in 2000 whereby Europe is to become "the most competitive and dynamic knowledge-based economy in the world" (`http://europa.eu/scadplus/glossary/lisbon_strategy_en.htm`).

However, compared to labour market statistics and occupational classifications, education has received much less attention in sociological research and official statistics: The consensus is that "the division of labor is the kernel of social inequality" (Ganzeboom and Treiman, 1996, p. 202), and much of sociological research is concerned with social class and status. Consequently, the International Standard Classification of Occupations (ISCO 88), developed by the International Labour Office (ILO), is much more widely known and used than the International Standard Classification of Education 1997 (ISCED 97) developed by United Nations Educational, Scientific and Cultural Organisation (UNESCO). There are also many more publications about the conceptualisation and measurement of occupation related information (e. g. Birkelund et al., 1996; Chan and Goldthorpe, 2006; Elias, 1997; Erikson, 1984; Evans, 1992; Ganzeboom, 2005b; Ganzeboom et al., 1992; Ganzeboom and Treiman, 1996; Goldthorpe, 2000; Goldthorpe and Hope, 1974; Hauser and Warren, 1997; Hoffmann, 2003; Jones and McMillan, 2001; Prandy, 1990, 1999b; Rose and Harrison, 2007) than about the conceptualisation and measurement of education related information (e. g. Braun and Müller, 1997; Brauns et al., 2003; Duru-Bellat et al., 1997; Fredriksen, 1983; Hoffmeyer-Zlotnik and Warner, 2005; Hopper, 1968; Kerckhoff and Dylan, 1999; Kieffer, 2007; König et al., 1988; Müller, 1979; Turner, 1960). Yet the division of labour and peoples' position in the occupational structure is strongly affected by education.

For both academic research and policy information, sample surveys of either households or individuals are, together with process-produced administrative information, one of the most important data sources. Educational attainment, which at the most general level means the highest level of education an individual has achieved, is considered as a core social background

variable. Social background variables "contain information necessary to define homogeneous subgroups, to establish causal relations between attitudes and societal facts, and to define differences between scores on scales" (Braun and Mohler, 2003, p. 112). Only recently, the Statistical Office of the European Communities (EUROSTAT) decided on uniform definitions of core social background variables such as age, sex, country of birth, educational attainment, status in employment and marital status to be included in all official European surveys (Eurydice, 2007b).

Educational attainment is thus one of the individuals' socioeconomic characteristics recorded in virtually all surveys that use persons as a unit of observation. Because of its wide use and theoretical importance, measurement quality with respect to educational attainment is particularly consequential. In terms of data quality, "a precise measurement not only of the survey variables but also of the socio-economic background variables is necessary" (Körner and Meyer, 2005, p. 150). However, the measurement of educational attainment is often not explicitly discussed because of the implicit familiarity of researchers with their own educational systems.

Moreover, academic research involving education and official education statistics are both areas for which *cross-national* evidence is crucial because of the institutional variation between educational systems in different countries: Micro-level theories involving education (especially with regards to social stratification processes) cannot be tested in single countries alone because the relationship between education and other variables is affected by how specific educational systems and labour markets work. Macro-sociological questions concerning the relationship between the organisation of education in a country and inequality of educational opportunity, economic and social returns to education, as well as a country's development can only be

approached using a comparative research design and multi-national data. Comparative research is thus highly fruitful for the development of sociological theory:

> "... cross-national research is valuable, even indispensable, for establishing the generality of findings and the validity of interpretations derived from single-nation studies. [...] Cross-national research is equally valuable, perhaps even more valuable, for forcing us to revise our interpretations to take account of cross-national differences and inconsistencies that could never be uncovered in single-nation research" (Kohn, 1987, p. 713).

Policy makers need indicators covering a multitude of countries in order to judge where their own country stands in the international race for e. g. economic competitiveness or social cohesion.[2]

Given the insights that cross-national research and international education statistics promise, the demand for international data on education has been high ever since the institutionalisation of the social sciences, first highlighted at the International Statistics Congress in 1853 and later in the establishment of the International Bureau of Education (IBE) in 1929 (Heyneman, 1999). Yet only since policy makers became increasingly interested in cross-national evidence and since intergovernmental cooperation has taken off in the areas of cultural collaboration, economic development and education monitoring after World War II, notably under the auspices of the UNESCO, the Organisation for Economic Co-operation and Development (OECD) and later also the European Union (EU), resources for collecting the relevant data have increased substantially.

2 An important initial question relates to which is the 'right' level of analysis for comparative research on educational processes and outcomes. Educational systems need not be homogenous across the territory of a sovereign state. However, most comparative studies and data sets are based on sovereign states or countries as the units of analysis rather than lower level units (like *Länder* in Germany), especially if the data collection is commissioned by top-level governments or other official bodies. Therefore, this study will stick to using states as representing educational systems. Also, in a somewhat simplifying way, this study will use the terms 'sovereign state' and 'country' interchangeably.

This went along with substantial changes in the *meaning* of education: Whereas earlier motives of the international bodies were the promotion of peaceful coexistence of the former enemies, development and education as a basic right to culture and asking for state provision of mass education (quantity), from the 1980s onwards the emphasis shifted to education as a post-industrial economic factor, economic competitiveness, the skill-set of the labour force, political accountability and evaluation of the outputs of education, thus quality (Cussó and D'Amico, 2005; Heyneman, 1999). Compared to health, trade and employment, education has thereby increased its relative standing in the range of international public policy issues in recent decades (Heyneman, 1999).

International education statistics thus get unprecedented attention by political actors, particularly because the quality of the reported data has improved substantially since the 1980s. The reporting of international education statistics by large international organisations like the OECD, EUROSTAT or the UNESCO, originally mostly derived from aggregate administrative data sources, has increased considerably in the last 20 years.[3] The international bodies increasingly include survey based figures in their published education statistics using a number of public administration-driven official surveys to monitor the development and quality of educational systems, labour markets, incomes and living conditions. These are most notably the European Union Labour Force Survey (EU-LFS) since 1983 (although predecessor studies exist since 1960), the European Communities Household Panel (ECHP, 1994–2001) and the European Union Survey on Income and

3 See e. g. the OECD's now annual 'Education at a Glance: OECD Indicators' series of which the first volume was published in 1992 (latest version: OECD, 2008), or the UNESCO's annual 'Global Education Digest', published since 2003 (latest version: UNESCO Institute for Statistics, 2007), preceded by the 'World Education Report', published between 1991 and 2000 (UNESCO, 2000). For more background on the development of international education statistics, see Cussó and D'Amico (2005); Heyneman (1999); Heyneman and Lykins (2008); Smyth (2008b).

Living Conditions (EU-SILC) since 2004 from EUROSTAT. Furthermore, there is a growing number of large cross-national *achievement* studies like the OECD's Programme for International Student Achievement (PISA, since 2000; http://www.pisa.oecd.org), the Adult Literacy and Life Skills Survey (ALL, 2003, Statistics Canada and OECD, 2005) and the International Adult Literacy Survey (IALS, 1994–1998, OECD and Statistics Canada, 1995, 2000).[4] Considerable public resources are invested in the production of such statistics, and more than ever before, educational systems abroad become an important point of reference for national education policies and education planning.

In addition, with the ongoing sophistication of survey methodology, more *academically driven* cross-national survey micro-data covering more and more countries have become available over the last decades. Examples are the Survey of Health, Ageing and Retirement in Europe (SHARE, since 2004; http://www.share-project.org), the European Social Survey (ESS, since 2002; http://www.europeansocialsurvey.org), the International Social Survey Programme (ISSP, since 1983; http://www.issp.org), the European and World Values Studies (EVS and WVS, since 1981 and 1991 respectively; http://www.europeanvalues.nl and http://www.worldvaluessurvey.org), and the European Election Studies (EES, since 1979; http://www.ees-homepage.net/).[5] Again, substantial sums of money are invested in survey organisation, data collection, processing and dissemination, and finally research using those data.

4 More studies, especially the Programme for the International Assessment of Adult Competencies (PIAAC) that builds on IALS and ALL experience, are in the preparation stage.

5 This enumeration is by far incomplete. For details on many of these and other cross-national surveys, see Heath et al. (2005) and Donsbach and Traugott (2008) as well as http://www.gesis.org/dienstleistungen/daten/portale-linklisten/comparative-survey-projects/.

Quantitative cross-national and cross-temporal research requires harmonisation of all variables involved across countries and/or time. Comparable measurement is one of the most important challenges for quantitative (variable based) comparative social research, which intends to push comparability to the highest achievable level. The comparable measurement of social background variables is however a neglected area: "Instruments allowing the compatible measurement of demographic and socioeconomic variables are badly needed" (Wolf and Hoffmeyer-Zlotnik, 2003, p. 2).[6]

Especially cross-nationally comparable measurement instruments for educational attainment can be regarded as "among the basic tools for sociologists' work" (Brauns et al., 2003, p. 221). However, the construction of such instruments is a very difficult undertaking. Since educational systems developed specific institutional peculiarities through history, they vary to a substantial degree between different countries (see e. g. König et al., 1988, p. 5):

> "Systematic institutional differences [...] can be found in many of the features of the organization of education: in differences in the actual openness of educational institutions brought about, for example, by tuition requirements; in the different divisions of secondary schooling into different school types; in the different ages at which selection for secondary school types takes place and in the different selection criteria employed; in differences in organizational and internal differentiation in the field of higher education and in its admission criteria; in differences in the integration of general and vocationally-oriented training; in differences in the importance of private and elite schools; in differences in the organization and spread of systematic further education after entry into the working world; in differences in the extent of co-education; and, in differences in the integration of educational measures for handicapped children into 'normal' school operations, and thus in differences in stigmatization and exclusion caused by the educational system [...]

6 Harmonised measures are however not only desirable in cross-national and cross-temporal research: The comparability of cross-sectional single-country studies could be largely increased if standardised measures for key variables would be used more consistently. This would in the long run facilitate reviewing the empirical literature, more formal meta-analysis and thus research progress.

> Finally, as regards the links between the educational system and the employment system, we find marked variations in the importance of school diplomas and training certificates on different national labor markets."

Strict comparability between educational qualifications, programmes and institutions thus simply cannot be achieved. However, dropping the entire endeavour of cross-national research involving education is not necessary: The solution to the problem lies in relaxing the requirement of 'strict comparability' to the 'functional equivalence' of educational qualifications and programmes. Establishing functional equivalence of educational programmes, institutions and qualifications is however not easy, either, and there are no clear rules for assessing the actual achievement of functional equivalence. Consequently, cross-national data pose a particular challenge to the measurement of educational attainment.

Because of these difficulties and the non-reducible characteristics of educational systems, there is some doubt with respect to how comparable and meaningful international education statistics and educational attainment data in surveys actually are. Yet also quite generally, "questions concerning the quality of survey data are strongly justified" (Alwin, 2007, p. 2). This is especially true for cross-national surveys that pose more methodological and organisational challenges than single-nation studies: For example, "cross-national variation in responses might arise just from the poor quality of data, but this possibility is rarely considered" (Blasius and Thiessen, 2006, p. 229).

Despite the wide utilisation of education measures, validation studies of different types of measures and, more specifically, different harmonised measures for cross-national research, are scarce. This is in line with a more general tendency in the social sciences not to give systematic attention to meas-

urement issues (Carmines and Zeller, 1979), and a certain reluctance of researchers "to face the problems that may be present in the survey. An 'ignorance is bliss' attitude seems to prevail and gratuitous assumptions are made about the quality of the data" (Lessler and Kalsbeek, 1992, p. 7). Most of the literature on cross-national comparability of measurement is actually concerned with attitudinal measures or other areas where structural equation modelling and reflective measurement using multiple questionnaire items can be applied.[7] The comparability of *formative* or single-item factual measures is rarely assessed, and the methodological 'toolkit' for such assessments is far less developed than the available statistical models for factor analytic measurement.

For example, among a number of ways of harmonising education information, the International Standard Classification of Education 1997 (ISCED 97) by the UNESCO is a standard that is widely used nowadays in international education statistics on the one hand and increasingly also in academically-driven cross-national surveys on the other. Although the OECD, EUROSTAT and UNESCO have used ISCED extensively for their statistical reports, the validity of ISCED as well as its reliability across different data sources has not yet been thoroughly assessed. Another example is the measurement of educational attainment by the number of years of education that an individual has completed. This measure is widely used especially by economists and often criticised on conceptual grounds. Consistent with the introduction of the concept of 'core social variables' for official European surveys, official bodies like EUROSTAT also recognise the need to work on the quality of educational attainment measures (Eurostat, 2007c). Therefore, there is a great

7 If latent constructs are theorised to cause the response (as is e. g. the case with attitudes), this is termed 'reflective measurement', whereas if the latent construct is a function of the responses (as is e. g. the case with socioeconomic status), this is termed 'formative measurement' (e. g. Howell et al., 2007).

need to improve the quality of cross-national survey data on educational attainment and resulting international education statistics.

This study presents an evaluation of cross-national measures of educational attainment that are commonly used in survey research. It intends to contribute to the 'craft of social science research' by finding some *dos* and *don'ts* of measuring educational attainment in sample surveys. For that purpose, different measures of educational attainment will be examined with respect to various kinds of non-sampling errors. Since this is a diverse and vast area, this study will particularly focus on the following two topics:

1. The consistency of usage of the foremost cross-national measure of educational attainment, the ISCED 97, across surveys and survey waves, and
2. the comparative information content of different cross-national measures of educational attainment in one data source.

As will be shown, the measurement of educational attainment in cross-national surveys is affected by a number of avoidable weaknesses which adversely affect the validity of claims based on analyses of these data. These weaknesses are often the result of insufficient conceptual grounding of the measurement of educational attainment in cross-national surveys because the definitions used are too loose and/or partly unsuitable, and of a lack in quality and standardisation of the national data collection instruments. Partly these are insufficiencies in data coverage by *conscious choice* because of specific priorities of survey organisers or national teams. The results could be used for the improvement of measurement practices in future cross-national surveys and survey waves, as well as the refinement of international education indicators.

The study will restrict itself to European countries and thus European surveys, for the reason that this is the world region for which most and probably also the highest quality cross-national data are available. Furthermore because of the lower level of variation in economic development across European countries as compared to the world as a whole, it is more realistic to achieve comparable measurement within a region like Europe than across a wider range of countries. Finally, ISCED 97 is used a lot by EUROSTAT for the compilation of EU education statistics.

The study is divided into three parts: Part I builds the basis for the remainder of the study. It discusses the concept of education, introduces the most commonly used cross-national measures of educational attainment and reviews studies that have evaluated measures of educational attainment before. It will also review the criteria by which cross-national measures of educational attainment will be evaluated in the later parts of the study.

In Part II, the measurement of educational attainment in a number of large-scale European cross-national surveys using the ISCED 97 will be examined, with a focus on the resulting data and the practical implementation process. Firstly, the consistency of the data will be assessed by comparing distributions of educational attainment over time within surveys and across surveys. Then, the actual data generation processes will be examined, including a close look at the data collection instruments and at the harmonisation procedures.

In the third part, different cross-national measures of educational attainment will be evaluated by comparing their information content. In a first step, the variation of different categorical measures will be compared for one of the European cross-national surveys, the European Social Survey (ESS). In a second step, using the same survey, the explanatory power of a number of

cross-national educational attainment variables will be compared with the explanatory power of the country-specific measures of educational attainment.

The findings will be synthesised in a final chapter. Furthermore, this chapter will present specific recommendations concerning the measurement of educational attainment in cross-national surveys and the use of educational attainment measures in empirical studies. It will e. g. discuss which measures work better than others on the basis of the findings from the earlier chapters, what the conceptual basis for choice between the different measures is, and what needs to be considered when implementing measures of educational attainment in international surveys.

Part I

FOUNDATIONS: CONCEPTS AND CROSS-NATIONAL MEASURES OF EDUCATIONAL ATTAINMENT, AND PREVIOUS EVALUATIONS THEREOF

INTRODUCTION

In this first part of the thesis, the foundations for the later chapters will be established. Chapter 2 introduces the different ways of measuring educational attainment in cross-national research that have been proposed thus far, and links them to the theoretical construct of educational attainment. Chapter 3 consists of a literature review of previous evaluation studies of measures of educational attainment. It concludes by introducing the main criteria for the evaluation of cross-national educational attainment measures used in this study.

2

CONCEPTS AND CROSS-NATIONAL MEASURES OF EDUCATIONAL ATTAINMENT

Measurement is defined by Carmines and Zeller (1979, p. 10) as "the process of linking abstract concepts to empirical indicants", i. e. theory and 'the outside world'. "The critical task for measurement is to design questions that produce answers reflecting perfectly the constructs we are trying to measure" (Groves, 2004, p. 43). Therefore, all measurement requires an explicit clarification of the underlying (unobservable) constructs and concepts (e. g. Alwin, 2007, p. 6), i. e. the "elements of information sought by the researcher" (Groves, 2004, p. 41).

Figure 2.1 visualises that analytical measures used in statistical estimations are derived from (source) data resulting from respondents' responses to questionnaire items, which are derived from indicators, which are in turn derived from theoretical constructs.[8] It also gives the potential sources of error related to each step (see also Groves, 2004, p. 48).

The clear specification of the relationship between constructs, indicators, questionnaire items and analytic measures is particularly important for comparative research, when an 'implicit' common understanding of the concepts and indicators involved is even less probable than in a non-comparative context. However, as Scheuch (2000) notes, there is a lack of reflection about the

8 The step from questionnaire item/source data to analytical variables can take many different forms, and the one-indicator-one-measure specification given here is just an example. Alternatively, one composite measure could be derived for all three indicators.

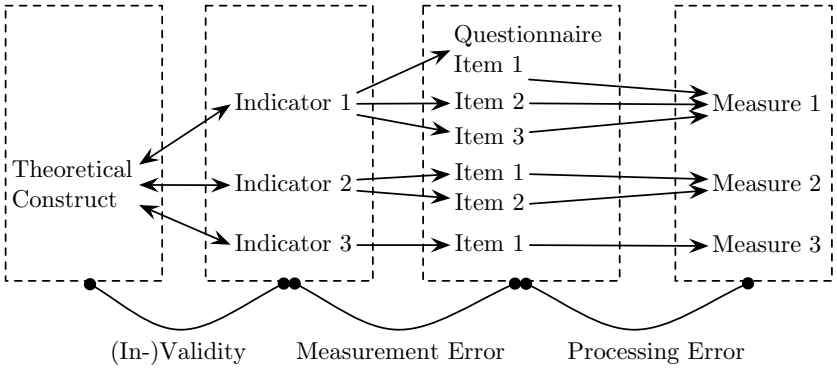


FIGURE 2.1: Operationalisation: From constructs to measures

meaning of survey questions in cross-nationally comparative research. This is especially true for educational attainment: Education is a typical control variable that is simply added to any multivariate individual level model because researchers 'know' that it correlates highly with many response and other explanatory variables (Kingston et al., 2003). There is often only little theorising about what theoretical construct it stands for and why it should have an effect on the chosen outcome variable. Accordingly, it is often referred to in a rather generic way (Burgess, 1986). Educational attainment can however mean quite different 'things', depending on the discipline, research area and theoretical focus. In this section, the most important ways of conceptualising educational attainment are therefore presented. Then, the chapter will move on to a presentation of different measures of educational attainment used in cross-national research.

2.1 THE CONCEPT OF EDUCATIONAL ATTAINMENT

Because of the importance of education for individuals' life chances and the importance of a skilled labour force for a society's prosperity, from a sociological point of view, the educational system can be regarded as another 'backbone' of modern society next to the labour market and the family. The

most prominent theoretical constructs commonly indicated by educational attainment are human capital, cultural capital and socio-economic status.

Human capital primarily comprises an individual's "useful skills and knowledge" that are "in substantial part a product of deliberate investment" (Schultz, 1961, p. 1).[9] An individual's investment in education is a means to improve one's employability and placement in advantageous job categories. Since schooling is considered to be the main source of human capital, the duration of schooling is commonly considered as the best indicator of an individuals' investment in human capital. For the measurement of human capital itself, economists often use educational certificates or *years of education* as proxies. If available, more direct measures of skills and competences are however closer to the concept of human capital.

Secondly, educational attainment is an indicator for 'cultural capital' (Bourdieu and Passeron, 1977), which means the individuals' cultural resources in terms of linguistic competences, cultural knowledge and attitudes required to succeed e. g. in the educational system or some other area of life. Cultural capital in the 'embodied state' consists (just like human capital) in "long-lasting dispositions of the mind and body" (Bourdieu, 1986, p. 243). It is, according to Bourdieu, best measured by the time invested in the acquisition of cultural capital (p. 246), which however has to go beyond the mere time invested in schooling and needs to consider the family-based intergenerational transmission of cultural capital, especially in early childhood.

Educational (and especially academic) *qualifications* are conceptualised as 'institutionalised' cultural capital (Bourdieu, 1986, p. 243). It allows individuals to *objectify* their embodied cultural capital, which "makes the difference

9 Although the notion of human capital is in fact much wider than this and refers to all kinds of productive capacities in people, including health and geographic mobility (Becker, 1993 [1964]; Schultz, 1961), in most applications human capital is restricted to the more narrow notion of productive skills and knowledge.

between the capital of the autodidact, which may be called into question at any time [...] and the cultural capital academically sanctioned by legally guaranteed qualifications, formally independent of the person of their bearer" (Bourdieu, 1986, p. 247). Educational qualifications facilitate the conversion of cultural capital to economic capital.

Thirdly, socio-economic status is an abstract construct referring to an individual's or a family's economic and social position in society. It is thus related to an individual's or a family's market power and social prestige. Educational attainment as an indicator for socio-economic status is usually combined with information on occupation, income and wealth. The construct is sometimes criticised for mixing up elements that are too distinct to be thought of as one 'thing' in a theoretically useful way. It is thus often preferred to disaggregate socio-economic status in more specific components like poverty, social class membership and educational attainment (see e. g. Hauser, 1972; Jencks et al., 1988).

Further individual characteristics that are not at the core of either human or cultural capital but are commonly thought to be indicated by an individual's educational attainment are social background, cognitive ability, discipline, trainability and motivation. Educational attainment is thus used by employers to *screen* applicants by these qualities. Especially educational certificates are seen as *signalling devices* (Arrow, 1973; Berg, 1970; Hirsch, 1976; Spence, 1973; Thurow, 1972; Young, 1958), as they are 'what selecting agents (employers, university admissions) actually see', e. g. when an applicant sends in a CV with copies of the diplomas and degrees mentioned in it, whereas the individual's actual human capital in terms of marginal productivity is unobserved.

This strand of theory, which developed as a reaction to the classical human capital approach, often conceptualises educational attainment as a *positional good* rather than an absolute one: "When everyone stands on tiptoe, no one sees better" (Hirsch, 1976, p. 5). Due to the scarcity principle, the relative value of education for the individual diminishes with the proportion of people who have the same or higher level of attainment. Therefore, if all individuals pursue more education in order to increase their life chances, at the collective level, the gain is entirely offset by the fact that *all* individuals do the same, which only lifts the level of education as a whole ('credential inflation', which might or might not advance social welfare and prosperity, but is certainly costly), but not the individual's position relative to others.

In an extreme version of this approach, education does not produce *any* human capital itself, but only tests and certifies cognitive ability, social background, discipline and motivation. According to allocation theory (e. g. Collins, 1971; Kerckhoff, 1976), ascriptive factors are continuously important also in modern societies: "the power of 'ascribed' groups may be the prime basis of selection in all organizations, and technical skills are secondary considerations depending on the balance of power. Education may thus be regarded as a mark of membership in a particular group (possibly at times its defining characteristic), not a mark of technical skills or achievement" (Collins, 1971, p. 1008). Allocation theory stresses that individuals are constrained by the social structure and selection processes. Through educational credentials (or the lack of them) individuals are marked for further selection processes in later life, for example in the labour market and higher education.

To summarise, how can the indicator 'educational attainment' be specified in operational terms? Since both human capital and (embodied) cultural

capital refer to inherent or abstract characteristics of individuals that are, in principle, unobservable, these concepts are impossible or rather expensive to measure directly. As proposed by both human capital and cultural capital theory, duration based measures are considered appropriate to capture the *investment in* capital. However, often is not the investment in capital of interest to researchers, but the actual *output*, i. e. amount (and type) of human/cultural resources the individual controls. Therefore, the *level of education an individual has reached* or *educational qualifications* are also often used as measures for educational attainment.[10] For signalling and allocation approaches, *only* formal qualifications are relevant.

Since all theoretical approaches (apart maybe from a strict, classical interpretation of human capital theory) regard educational credentials as an important resource for the individual, the most common understanding of educational attainment refers to the highest educational qualification obtained by an individual. It is however widely acknowledged that employers in some cases also recognize attendance of an educational programme if it was not successfully completed (e. g. when an individual attended university for a number of years without graduating). Therefore, the qualification achieved might not be sufficient as a measure of educational attainment, and the human capital and credentialing approaches need to be combined. Finally, the ranking of individuals on any of those conceptualisations of educational attainment rather than the absolute position could be used to reflect educational attainment as a positional good.

The level of educational attainment can thus operationally refer to the *duration of the educational experience*, the level of the highest or last educational

10 The European Qualifications Framework for Lifelong Learning (EQF) defines a qualification as "a formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards" (European Commission, 2008a, p. 11).

institution or programme *attended* or *completed* as well as the level of the highest or last educational *certificate achieved*.

The notion of 'level of education' in a strict sense seems to imply a unidimensional conceptualisation of educational attainment. Given the high degree of differentiation of educational systems today (e. g. Kogan, 2008), it is however increasingly difficult to conceive educational attainment as a unidimensional concept that can be understood in purely quantitative terms of 'more' or 'less' education. Therefore, the term 'level of education' will be used here in a wider sense, *including* qualitative differences between types of education, especially vocational and general education.

In academic research, vocational education and training has for a long time played "the role of a greatly neglected child" (Mayer and Solga, 2008, p. 6), compared to the importance assigned to general and higher education. The joint UNESCO/ILO recommendations on technical and vocational education and training (TVET) define technical and vocational education as

> "a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life" (UNESCO and ILO, 2002, p. 7).

There are three arguments in favour of the inclusion of TVET in the wider concept of educational attainment:

1. TVET contributes to socialisation, increases the individual's human capital, and thus usually means a step forward in the 'job queue'.

2. General and vocational education on the one hand and vocational education and training on the other hand are becoming increasingly inseparable, and it is impossible to draw the line between them in a consistent way cross-nationally (see also König et al., 1988, p. 56–57).
3. The signalling value of educational qualifications differs substantially across countries, particularly in terms of the provision of specific occupational skills in vocational education and training and in terms of the degree of standardisation (see e. g. Breen, 2005; Breen and Buchmann, 2002).[11]

Therefore, the notion of education has to be used in a wide sense—covering general and academic education ('Bildung') as well as vocational and professional education and training ('Ausbildung')—in cross-national research.

To summarise, at the conceptual level, educational attainment can be generally defined as *an individual's highest level of formal education achieved*, including qualitative differentiation within levels of education. This notion needs to be further specified for operational purposes depending on the theoretical focus of the study. 'Level of education' can refer to educational programmes or certificates. 'Achieved' can mean either that an educational programme was 'reached' in terms of entry, or that a level of education was successfully completed in terms of exit from the programme. With respect to the latter, successful completion is usually associated with the acquisition of an educational certificate. Educational attainment can also be proxied in a rather unspecific way (i. e. ignoring signalling and qualitative differences between types of education) by the duration of the educational experience, which is

11 Whereas TVET serves to only give basic occupational skills to low-ability pupils who are unable to follow academic programmes in some countries (e. g. Italy, Spain and France), it imparts very specific vocational skills in others, where vocational training programmes are highly standardised and combine schooling and workplace training (e. g. Germany, Austria, Switzerland, the Netherlands and Denmark). Other countries again avoid a high degree of specialisation while still providing rather high-quality transferable vocational education (e. g. Sweden).

otherwise rather a measure of 'input', i. e. investment in education rather than output.

2.2 CROSS-NATIONAL MEASURES OF EDUCATIONAL ATTAINMENT

Educational attainment is like much factual data usually 'directly measured', i. e. derived from source data that come about by administering questionnaire items to survey respondents, through more or less simple recoding. This is in contrast to e. g. the measurement of social attitudes or academic competences that are often conceived of as latent constructs and thus measured by scales derived from multiple (reflective) indicators using factor analytic techniques. Moreover, whereas educational attainment often enters index measures such as socioeconomic indices (SEIs), it is not usually conceived of as a composite index itself.

Because of the differences between educational systems and qualifications awarded, it is impossible to use exactly the same data collection instruments and thus use an input harmonisation approach for the measurement of *levels of education* or *qualifications* in different countries.[12] The common approach to measuring educational attainment in cross-national surveys thus consists in collecting data on educational qualifications or levels of education using country specific instruments. The resulting country-specific education variables (CSEVs) are then harmonised into a cross-nationally comparable scheme by recoding (output-harmonisation), which then can be used in statistical analyses or subjected to further recoding (Statistisches Bundesamt,

12 Detailed background information on different European educational systems, even a summary of which extends the scope of this study, can be found in König et al. (1988, for the early developments until the 1970s), Kogan et al. (2008, focus on ten Central and Eastern European countries and institutional change since 1989), Hörner et al. (2007, covering *all* European countries), Schneider (2008c, describing 15 European countries with a special focus on ISCED 97), the Information Network on Education in Europe (EURYDICE)'s database on education systems in Europe, Eurybase (Eurydice, 2009) and the IBE's World Data on Education (UNESCO International Bureau of Education, 2007).

2004). If the cross-national scheme to be used is specified *before* the data are collected, i. e. during the design phase of the survey, the harmonisation approach is called 'ex-ante output harmonisation'. If the cross-national scheme is specified *after* data collection, such as when national surveys that were designed independently of each other are harmonised, the harmonisation approach is called 'ex-post output harmonisation' (e. g. Körner and Meyer, 2005).

Different user communities have developed a number of ways of operationalising educational attainment for cross-national research. These different measures often reflect conceptual and methodological choices. Using *actual* or *hypothetical years of education* (Section 2.2.1) or *educational scoring* (Section 2.2.2) provides the advantage that education can be parsimoniously included in statistical analyses as a linear variable. International categorical frameworks like the CASMIN education scheme (Section 2.2.3) and ISCED 97 (Section 2.2.4) formulate a set of exclusive categories and then re-classify country-specific education categories according to some underlying 'common denominator', usually along the basic distinctions of *levels* of education (primary, secondary and tertiary) on the one hand and *orientation* of the educational programme (general or vocational) on the other. They aim at a shared methodological paradigm while still allowing sufficient representation of national peculiarities.

2.2.1 *Years of education*

Following Blau and Duncan (1967), social researchers and economists often resort to years of education or schooling (or measures derived thereof) as a measure reflecting the amount of education that individuals have received (e. g. Eikemo et al., 2008; Hauser, 1972; Kunovich and Slomczynski, 2007;

Scheepers et al., 2002; Treiman et al., 2003; Treiman and Yip, 1989). *Years of education* can either be measured directly (*actual years of education*) or they can be derived from country-specific education categories (*virtual* or *hypothetical years of education*, see e. g. Ganzeboom et al., 1992).

Actual years of education is the only cross-national measure of educational attainment that can be achieved through input harmonisation. For collecting this information, different surveys use different question wordings. For example, the ESS asks "How many years of full-time education have you completed?", whereas the International Social Survey Programme (ISSP) enquires about "years (of full time) schooling including university but not vocational training" (Hoffmeyer-Zlotnik and Warner, 2005, p. 230). *Age at leaving full-time education* (e. g. Weakliem, 2002) is a related measure which does not take the different starting ages of compulsory education in different countries into account. Obviously, these different ways of measuring *actual years of education* will produce different results.

These measures build on the assumption that firstly "the longer someone is exposed to education, the more skills and knowledge he or she can acquire, and the more he or she is socialised, directly or indirectly" and secondly "all kinds of skills and knowledge are of similar value" (Braun and Müller, 1997, p. 170). With regards to the first assumption, when using *actual years of education*, individuals who repeat a grade or otherwise take longer to complete some educational programme appear to be more highly educated than 'faster' (and thus potentially more able) individuals. With regard to the second assumption, *actual years of education* can be considered to be an inadequate measure of educational attainment for stratified educational systems such as those in most European countries because the returns to different

educational programmes of similar duration probably differ (see e. g. Ganzeboom and Treiman, 1993; Smith and Garnier, 1987).

For these reason, *hypothetical years of education* might be a more adequate measure of educational attainment. *Hypothetical years of education* assign the number of years it theoretically or typically takes to complete some educational programme or career to country-specific education categories, sometimes additionally taking track differences into account. When deriving *hypothetical years of education* from the CSEVs, there are however no set rules about how many years of education to assign to specific qualifications, and this always involves some degree of judgment. For example, in Hauser (1972), incomplete studies are assigned a value referring to the years of education actually attended, up to one year below the years assigned to individuals who *completed* their studies. Hauser also gives "up to a year's credit for extended vocational training" (p. 164). Ganzeboom and Treiman (1993, p. 476) describe their method for assigning scores as follows:

> "Our approach is to assign scores to educational categories on the basis of intrinsic knowledge of the educational system involved. Typically, those categories known to correspond to a specific number of years of education are initially assigned scores, and the remaining categories are then interpolated, with adjustments of the scores (including those initially assigned) to accommodate differences in the qualifications resulting from particular types of schooling among those who obtain the same amount of schooling. The advantage of years of education over a simple rank order of the categories is that the constructed variable is (in principle) completely comparable across studies and has an interpretable metric. The major disadvantage is that adjustments to accommodate 'slow' and 'fast' (academic and vocational) tracks violate the strict interpretability of the resulting scale as measuring year of schooling; what the scale measures is something more like 'virtual' years of schooling."

This assignment process can be regarded as 'arbitrary weighting' of a score. Both *actual* and *hypothetical years of education* are used as interval level vari-

ables in statistical models. However, "a year of schooling may well vary in its effect on occupational status depending upon where in the educational career it comes" (Treiman and Terrell, 1975, p. 368). This could firstly be reflected by adding a non-linear term in the regression equation or otherwise adapt the model specification. Many authors preferred to drop the approach of using 'years of education' when analysing data from stratified educational systems and use either scaling methods or categorical classifications instead, described in the next subsections.

2.2.2 *Scoring and related measures*

More rarely, scaling approaches are used in order to convert country-specific education categories to a common metric using some criterion variable, e. g. occupational status or prestige or father's occupation (Ganzeboom and Treiman, 1993; Smith and Garnier, 1987; Treiman and Terrell, 1975). This means that the mean occupational attainment score of all individuals in some education category is assigned to these individuals. Effect-proportional scaling assumes that, as with *years of education*, "a single dimension underlies the educational categories and that scores on the underlying dimension can be assigned to each category" (Ganzeboom and Treiman, 1993, p. 476).

The advantage of the optimal scaling approach is that all variation of CSEVs with respect to the chosen criterion is picked up in the scaled variable so that *with respect to this criterion*, no information gets lost: "Such a method produces a scale which has the maximum correlation with the criterion variable of any possible scaling of the original categories" (Treiman and Terrell, 1975, p. 571). However, this relies on the assumption that firstly, the nationally specific measures used for the scaling are in fact exhaustive categorisations

of attainment within the countries used, and secondly, that the criterion is measured in a strictly comparable way (Braun and Müller, 1997).

A related measure that was proposed rather recently is the 'Hoffmeyer-Zlotnik/Warner matrix of education' (Hoffmeyer-Zlotnik and Warner, 2007, 2005), which combines scaling and ranking elements. It arranges educational qualifications according to the social prestige of the occupations that holders of these qualifications typically achieve from 0 to 10.[13]

An advantage or disadvantage of these approaches, depending on the researcher's interest, is the fact that "an optimal scaling procedure can be used without reference to the meaning of categories" (Ganzeboom and Treiman, 1993, p. 477). This might make sense when educational attainment categories are not of interest in themselves, but when education is used as a control variable. Otherwise Ganzeboom and Treiman (1993) regard scaled education variables as well corresponding to the concept of education as a relative or positional good (see Thurow, 1972), which also underlies the approach by Hoffmeyer-Zlotnik and Warner (2007).

These measures are however not widely used. One of the reasons for this is that they do not have an internal metric, but 'borrow' their units from an external criterion (Treiman and Terrell, 1975, p. 576), which turns them into a relative measure. Substantively, education scores are thus not direct measures of educational attainment any more: They describe the 'value' of education expressed in units of the criterion variable used for the scaling. This means that education scores will be different for different criterion variables so that comparability across outcomes is problematic, resulting in "endless relativism" (Braun and Müller, 1997, p. 172). A scaling approach might thus not

13 To my knowledge this measure has not yet been applied in any cross-national study, and the specific implementation is only shown in Hoffmeyer-Zlotnik and Warner (2007) for four countries.

be meaningful for all types of studies, and is especially problematic for comparisons across cohorts or countries when the inherent relationship between educational attainment categories and criterion variable differs across countries and time points (Ganzeboom and Treiman, 1993, p. 477).

2.2.3 *The CASMIN education scheme*

The most influential categorical measure of educational attainment in academic cross-national social stratification research was developed in the project 'Comparative Analysis of Social Mobility in Industrial Nations (CASMIN)' in the 1970s and 1980s (Brauns et al., 2003; König et al., 1988; Lüttinger and König, 1988; Müller et al., 1990).[14] It is commonly referred to as the 'CASMIN education scheme'. The CASMIN scheme regards the educational system as a 'sorting device' for the positioning of individuals in the social class structure. It is theoretically based on Bourdieu's work on cultural capital and schooling success (Bourdieu and Passeron, 1977) as well as signalling approaches to the effects of education on the labour market (e. g. Spence, 1973). CASMIN was specifically designed for comparative social stratification and mobility research, especially on social class reproduction, and was used in a number of seminal cross-national studies on social stratification and mobility (e. g. Breen, 2004b; Breen et al., 2009; Erikson and Goldthorpe, 1992; Shavit et al., 2007; Shavit and Blossfeld, 1993; Shavit and Müller, 1998).

2.2.3.1 *Units of classification and classification criteria*

CASMIN is based on educational certificates and intends to classify functionally equivalent qualifications across countries together, where functional

14 The original German version of König et al. (1988) is König et al. (1987).

equivalence refers to the *selectivity effects* of different qualifications for intergenerational social class (im-) mobility. The researchers developing the scheme aimed at categories which "should, to the greatest extent possible, both optimally reflect the typical, class specific barriers in the educational system, as well as grasp the differentiations relevant for utilization on the labor market" (Müller et al., 1990, p. 67). This reflects the two main 'steps' in social class reproduction: the influence of one's social class origin on educational attainment on the one hand, and the effect of one's educational attainment on the attainment of one's social class position on the other. However, given the importance of educational certificates for many theoretical approaches beyond the perspective of social stratification research, the usefulness of the CASMIN scheme extends beyond this initial application (König et al., 1988, p. 78, note 84).

The CASMIN scheme is two-dimensionally structured by the following criteria (König et al., 1988, p. 55):

1. The vertical distinction of levels of education, which is proxied by the costs, length and quality of the educational experience, intellectual abilities required and value of the resulting certificate in the labour market. The hierarchical level is mainly operationalised through the possibility of access to higher education, and are denoted as 1 (elementary, i. e. non-selective, compulsory/minimum education), 2 (secondary, i. e. intermediate education between non-selective minimum schooling and up to the university entrance qualification) and 3 (higher/tertiary, i. e. all education after acquisition of the university entrance qualification).
2. The horizontal distinction between 'general' and 'vocational' education. Whereas the former usually prepares for continuation of education up

to university entry, the latter is intended to convey practical knowledge and skills for specific occupations and thus labour market entry.

2.2.3.2 *Categories of the CASMIN education scheme*

The original CASMIN scheme (König et al., 1988) contains eight categories:

1a. Inadequately completed general elementary education;

1b. General elementary education (non-selective, compulsory);

1c. Basic vocational qualification or general elementary education and basic vocational qualification;

2a. Intermediate vocational qualification or intermediate general education plus basic vocational qualification;

2b. Intermediate general qualification (or selective education requiring a longer education than *1b*);

2c. Full maturity certificate;[15]

3a. Lower tertiary certificate (building on *2c* but shorter and more practically oriented than *3b*); and

3b. Higher tertiary certificate (traditional university degree and above).

Since the CASMIN scheme was developed for use with data gathered in the 1970s, it was updated by Brauns and Steinmann (1999) in order to reflect more recent changes in the educational systems in France, Germany and the United Kingdom. Category 2c was split into *2c gen* for general maturity certificates and *2c voc* for vocational maturity certificates or general maturity certificates followed by a vocational qualification. Category 3a was divided into *3a gen*, general diplomas from lower tertiary education, and *3a voc*, diplomas with vocational emphasis from lower tertiary education, and category 3b into *3b low*, higher tertiary education (lower level) and *3b high*, higher

15 This is the notation given in Brauns et al. (2003). The boundary between 2 and 3 was changed after the initial design of the classification, which assigned matriculation certificates as 3a rather than 2c, where the higher qualifications were thus 3b and 3c respectively.

tertiary education (higher level). The two latter distinctions were mainly targeted at the French and British educational systems, although in principle such distinctions can also be made for other countries. They will generally become important in the long run because of the Bologna reforms (Bologna Working Group on Qualifications Frameworks, 2005; Eurydice, 2009).

2.2.3.3 *Application of CASMIN*

CASMIN is usually applied to data by ex-post output-harmonising available CSEVs on the individuals' highest educational qualification. The problems related to the sometimes insufficient national data and historical changes in educational systems are described in some detail by König et al. (1988, p. 59–61): For example, sometimes a pragmatic compromise must be reached e. g. when CSEVs do not differentiate qualifications that could on theoretical grounds be validly differentiated in CASMIN.

König et al. (1988, p. 61–68) also describe how to match national education categories to CASMIN in Germany, France, Hungary, Ireland, Poland, Sweden and the United Kingdom (distinguishing Scotland and Northern Ireland from England and Wales). Recent tables mapping national educational qualifications to the updated CASMIN categories can be found in Brauns et al. (2003) for France, Germany, Italy and the United Kingdom. The application of CASMIN to the ESS data is shown in Table D.2 and will be used and discussed further in Part III of the study.

In terms of usage of CASMIN, Brauns et al. (2003, p. 242) suggest to

> "apply a more refined classification to single countries that better accounts for the institutional diversity within the respective educational system. [...] The CASMIN framework is flexible enough in use to allow for the further differentiation within the framework of straightforward comparable categories to obtain—where needed—the most detailed picture of national educational credits."

An additional benefit of using differently detailed measures in statistical analyses is that this allows the researcher to perform basic sensitivity checks to find out if the aggregation of different qualifications in one CASMIN category is valid.

2.2.4 *The International Standard Classification of Education*

In order to compare aspects of education cross-nationally, "it is necessary that the required data become available for the different countries on the basis of an internationally accepted standard classification scheme encompassing all types of educational programmes that a country can possibly have" (UNESCO, 1999, p. 4). ISCED is designed to serve as such a scheme, and is supposed to be suitable for assembling and presenting comparable education statistics (on e. g. enrolment and attainment) both within and across countries. The purpose of ISCED is not restricted to facilitating statistical reporting and cross-national research, but includes monitoring of international development goals involving education targets and the provision of background information for national education policy formulation and decision-making (UNESCO, 1999, p. 5). ISCED is thus a multidimensional multi-purpose cross-classification for harmonising national educational programmes into a cross-national framework for levels and fields of education (fields of education will not be discussed in this study, but see UNESCO 2006 [1997], p. 41–45). It is mostly used for international statistical reporting by UNESCO, OECD and EUROSTAT, but it can in principle be adapted for the measurement of individuals' educational attainment in sample surveys, as regularly done in surveys coordinated by EUROSTAT.

The first version of ISCED, ISCED 78 (with a predecessor from 1958), was adopted by the UNESCO General Conference in 1978. The use of this classification over the following 20 years by national authorities and international organisations revealed its inadequacies: the ISCED 78 was considered limited in scope, too crude to embrace recent changes in educational systems, not clearly specified and thus difficult to apply (OECD, 1999; Sauvageot, 2001). For example, apprenticeship training in the dual system in the German speaking countries was not covered, which hugely distorted the picture of secondary education cross-nationally (König et al., 1988; Sauvageot, 2001). ISCED was therefore revised in 1997 (OECD, 1999; UNESCO, 1999, 2006 [1997]).[16] At the 34th general conference of the UNESCO in Paris in 2007, it was again decided to undertake a "revision of the International Standard Classification of Education ... in view of the major changes that have taken place in the adaptation and the structuring of education systems since the last revision" (UNESCO, 2007). In fact, already Sauvageot (2001) describes a number of conceptual and implementation problems of the ISCED 97. It is planned that a revised version of ISCED 97 will be adopted at the UNESCO General Conference in 2011.[17]

ISCED 97 is currently implemented in a wide range of cross-national surveys, e. g. in the ESS, SHARE (first two waves only), EU-LFS, EU-SILC and the PISA studies. ISCED 78 was used e. g. in the ECHP and IALS. Among the studies using ISCED-related measures are e. g. Domanski and Przybysz (2007); Müller

16 For an overview of the development of ISCED, see Smyth (2008b) and Sauvageot (2001).

17 A detailed conceptual review of the ISCED 97 is beyond the scope of this study and included in Schneider and Kogan (2008). A few issues however should also be mentioned here. First of all, the development of the ISCED mappings itself does not guarantee comparability of the ISCED categories: National Statistical Institutes (NSIs) could apply the ISCED criteria and definitions in inconsistent ways. Some evidence for this is given in Schneider and Kogan (2008). However, with few exceptions, these problems do not invalidate the use of the ISCED 97 altogether and can in principle be solved by re-assigning country-specific education categories to ISCED categories. This will however not be attempted in this study which thus evaluates the 'official' version of ISCED rather than the revised mappings proposed in some of the chapters in Schneider (2008c).

(2005); Saar et al. (2008); Steedman and McIntosh (2001); von dem Knesebeck et al. (2006) and Huisman et al. (2003).

The documentation of ISCED 97 can be found in a number of publications by the UNESCO and the OECD. UNESCO (2006 [1997]) contains the formal framework and introduces the basic definitions and concepts of ISCED 97. UNESCO (1999) is supposed to support countries in the application of ISCED to their national data in a more operational way. The OECD manual (1999) provides the most detailed documentation on ISCED 97, and in a few instances deviates from the UNESCO's conceptualisation of ISCED 97. Such deviations will be highlighted in the following sections. The manuals for the yearly UNESCO-UIS/OECD/EUROSTAT (UOE) data collection (for the latest versions, see UNESCO-UIS, OECD and EUROSTAT, 2008a,b,c) in chapters 6–17 duplicates information from the OECD manual and particularly address data providers in education ministries or NSIs.[18] Finally, the OECD has published a handbook on international education statistics in 2004b (OECD, 2004b) that contains information on ISCED 97. There are also some publications with detailed information about ISCED authored by experts who were involved in the revision process for ISCED 97 (Sauvageot, 2001; Smyth, 2008b) or users of ISCED 97 (Kieffer and Tréhin-Lalanne, 2008; Schneider, 2008c).

The OECD (1999) manual includes conversion tables proposing how the national educational programmes and qualifications of all OECD member states could be allocated to ISCED 97 categories, which were developed by the member countries in consultation with the OECD Secretariat.[19] "These proposals

18 In 2008, the UOE data collection jointly administered by UNESCO Institute for Statistics (UNESCO-UIS), OECD and EUROSTAT comprised more than 60 countries worldwide. It produces aggregate data on students enrolled, entrants, graduates, graduations, repeaters, average class size, educational personnel, education and research expenditures and other concepts by level of education, type and field of education, type of institution, age, sex etc. in accordance with the ISCED. Results are e. g. published in Eurydice (2007a); Eurydice and Eurostat (2005).

19 Unfortunately, these mappings are not widely known yet: Some users of ISCED do not mention them, such as Hoffmeyer-Zlotnik and Warner (2005) and Erikson and Jonsson (2001),

represent the starting point for a process of consultation within the Technical Group, with the aim of working towards an internationally agreed upon allocation of national educational programmes to ISCED 97 in the OECD" (OECD, 1999, p. 10). Eurostat (2005) contains comparable mapping tables for use in the UOE data collection, which can be regarded as an update from the OECD tables and also include EU-member states that are not covered by the OECD tables (e. g. Bulgaria and Estonia). These tables also contain information on some ISCED criteria, such as the typical starting age of the educational programme, its theoretical duration, and minimum entrance requirements.[20] The UNESCO/OECD World Education Indicators Programme (2000) and UNESCO Institute for Statistics (2006) additionally published ISCED mappings for 16 and 19 non-OECD countries respectively, including Brazil, China, Egypt, India, Indonesia, the Russian Federation, and Zimbabwe. The OECD handbook (2004b) as well as Eurydice and Eurostat (2005, p. 56–63) contain mappings in a graphical rather than tabular format, organising educational programmes according to students' typical age of entry and exit and thus visualising the structure of educational systems across countries.

2.2.4.1 *Basic definitions of ISCED 97*

ISCED 97 is made up of a set of concepts and definitions, which are assumed to be universally applicable, as well as operational instructions. This is highly important since educational institutions and certificates have sometimes the same or similar names when e. g. translated into English, but

and Hoffmeyer-Zlotnik and Warner (2005) apply ISCED to German qualifications in a way that does not conform to the ISCED mappings, e. g. classifying Master crafts diplomas as ISCED level 4 rather than 5B. The way they describe the ISCED 97 levels also reveals some misunderstanding of levels 4 and 5.

20 Despite the yearly updates of the UOE mappings, no more recent mappings have been published online.

entirely different meanings.[21] In the framework of ISCED 97, education is defined to comprise all communication (using different modes and media) designed to bring about learning, i. e. improvement in behaviour, knowledge, skills etc., in an organized and sustained setting involving a providing agency (UNESCO, 2006 [1997], p. 9–10). According to this definition, incidental or non-formal learning (i. e. as a by-product of some event or activity) is not covered. Otherwise, the ISCED framework is very general in scope, as it covers education thus defined "for all age groups and includes special needs education as well as other types of education irrespective of the institution or agency providing the education or the mode of delivery" (UNESCO, 1999, p. 5). Therefore, distance, adult and continuing education are included, too, and usually assigned to ISCED categories on the basis of their equivalence with regular education programmes (UNESCO, 2006 [1997], p. 13).

In contrast to CASMIN, the basic unit of classification of ISCED is the *educational programme*, which is defined on the basis of its "educational content as an array or sequence of educational activities, which are organised to accomplish a pre-determined objective or specified set of educational tasks. Objectives can, for example, be preparation for more advanced study, qualification for an occupation or range of occupations, or simply an increase of knowledge and understanding" (UNESCO, 2006 [1997], p. 11). 'Educational activities' are not restricted to *courses*, but may include *practical periods of work* in companies, team-based *research projects* and the individual writing of *dissertations*. In most cases, the completion of an educational programme

21 See e. g. the erroneous use of the term 'high school' by Hoffmeyer-Zlotnik and Warner, 2005 as a direct translation from the German term 'Hochschule': The context clearly indicates that the authors actually meant higher education institutions, although native English speakers, especially Americans, would understand 'high school' to refer to *secondary* school. Similarly, the term 'primary school' has different meanings across countries and thus needs to be clearly defined for cross-national purposes.

and thus accomplishment of the pre-determined objective is formally certified through an award, diploma or the like. Thereby ISCED can, like CASMIN, also be used for classifying educational qualifications.[22]

2.2.4.2 *ISCED 97 main levels of education*

ISCED levels of education are meant to relate to "gradations of learning experiences and the competences which the contents of an educational programme require of participants if they are to have a reasonable expectation of acquiring the knowledge, skills and capabilities that the programme is designed to impart" (UNESCO, 2006 [1997], p. 15). ISCED 97 classifies educational programmes into seven broad ordinal levels (0 to 6), which thus mean to reflect the degree of complexity of the content of an educational programme in broad steps from very elementary to more complex learning experiences. The definitions of some levels of education were changed and the rules for assigning educational programmes to specific levels were clarified and tightened in ISCED 97 compared to ISCED 78. The following paragraphs describe the seven main ISCED levels.

ISCED level 0 (pre-primary education) is defined as programmes forming the "initial stage of organized instruction ... designed primarily to introduce very young children to a school-type environment, i. e. to provide a bridge between the home and a school-based atmosphere" (UNESCO, 2006 [1997], p. 20). Pre-primary education is school or centre-based, starts at age three or later and lasts up to the age of entry into primary education. In contrast

22 Technical documentation specifying how to adapt ISCED 97 to the measurement of educational *attainment* and how to implement it in cross-national surveys is however not currently available, although this was announced to be part of the operational manual in UNESCO (2006 [1997], p. 7). In order to use ISCED for the measurement of educational attainment instead of enrolment, the certificates *resulting from* educational programmes need to be classified rather than the programme itself. Fortunately, certifications are also indicated in the (tabular) mappings.

to child-care, which is not covered in ISCED level 0, staff in pre-primary education need a pedagogical rather than paramedical qualification. For the measurement of educational attainment, ISCED 0 would be used to classify individuals who did not receive any substantial amount of formal schooling, i. e. who completed less than primary education.

ISCED level 1 (primary education or first stage of basic education) programmes "are normally designed on a unit or project basis to give students a sound basic education in reading, writing and mathematics along with an elementary understanding of other subjects such as history, geography, natural science, social science, art and music" (UNESCO, 2006 [1997], p. 22). The transition from ISCED level 0 to 1 is marked by the beginning of systematic (and usually compulsory) studies, and the minimum and maximum entry age is five and seven years respectively. Primary education lasts up to entry into lower secondary education, typically after six years. In countries where primary and lower secondary education are integrated in one long educational programme ('basic education'), only the first 6 years count towards ISCED level 1. In terms of educational attainment, individuals who completed primary education, but did not receive an ISCED level 2 qualification, are assigned to ISCED level 1.

ISCED level 2 (lower secondary education or the second stage of basic education) is marked by the full implementation of basic skills, the beginning of subject presentation and more specialised teaching than level 1. "In many, if not most countries, the educational aim is to lay the foundation for lifelong learning and human development on which countries may expand, systematically, further educational opportunities" (UNESCO, 2006 [1997], p. 24). It starts after the end of primary education or the first six years of basic education and ends around nine years after the beginning of primary education,

i. e. at age 14–16, which often coincides with the end of compulsory education. In many countries, the first school leaving certificate is awarded upon successful completion of this level of education, which often is decisive in terms of which type of educational programme can be followed at the next higher level.

ISCED level 3 (upper secondary education) constitutes the first level of post-compulsory and the final stage of secondary education in most OECD countries. Usually the completion of ISCED level 2 is required for entry into ISCED 3.[23] The degree of specialisation is increased compared to level 2, and teachers typically need higher or more specialised qualifications. The age of entry is typically age 15 or 16 (but sometimes 14), and the duration can range from two to five years. The typical exit age is 18 or 19.

ISCED level 4 (post-secondary, non-tertiary education) "captures programmes that straddle the boundary between upper secondary and post-secondary education from an international point of view, even though they might clearly be considered as upper secondary or post-secondary programmes in a national context" (UNESCO, 2006 [1997], p. 31). These programmes require the completion of ISCED level 3, but are often not considered significantly more advanced than level 3 (e. g. second cycle or second chance programmes, often for 'correcting' the choice of programme at level 3, or continuing/adult education). Their duration is between six months and two years. This level did not exist in ISCED 78, and the respective programmes were either assigned to ISCED levels 3 or 5.

23 In some countries compulsory education however extends into ISCED level 3, e. g. education is obligatory in Germany until age 18 (although there are some variations across the federal states), and in Hungary compulsory education lasts until age 18. In the United Kingdom, compulsory education was also extended to age 18 by the Education and Skills Act 2008. Since compulsory education requirements vary a lot across countries, it is very problematic to use as a criterion for ISCED.

ISCED level 5 (first stage of tertiary education) "consists of tertiary programmes having an educational content more advanced than those offered at levels 3 and 4" (UNESCO, 2006 [1997], p. 34). Such programmes are provided by various types of colleges and universities and have special entry requirements (certificates from ISCED levels 3 and 4). The cumulative duration from the beginning of level 5 is at least two years, but completing two programmes of a cumulative duration of four to six years at level 5 is common. These programmes do not yet lead directly to an advanced research qualification.

ISCED level 6 (second stage of tertiary education) "is reserved for tertiary programmes which lead to the award of an advanced research qualification. The programmes are therefore devoted to advanced study and original research and are not based on course-work only" (UNESCO, 2006 [1997], p. 39). These are thus exclusively higher education programmes that require the submission of a thesis of publishable quality, and conclude with the doctorate or PhD, or the Licentiate in a few countries. They prepare for research and faculty posts.

Since it is practically impossible to directly assess and compare the complexity of the content of all educational programmes for all countries, ISCED 97 uses a number of auxiliary criteria as proxies. These auxiliary criteria are ranked into main and subsidiary criteria, which complement each other (UNESCO 2006 [1997], p. 16 and OECD 1999, p. 13). These criteria include e. g. the typical starting age of participants, theoretical and typical duration of a programme, typical and minimum entrance requirement, type of certificate or diploma awarded upon successful completion of the programme and others. No auxiliary criterion should be the sole guide for attributing an educational programme to a certain level, but variations could be envisaged,

keeping the content of the educational programme as the primary classification criterion in mind. Table 2.1 gives an overview of main and subsidiary criteria for assigning ISCED levels.

2.2.4.3 *Sub-categories within ISCED 97 main levels*

ISCED 78 did not provide any sub-categories within the different ISCED levels, which is why it was criticised for being too undifferentiated. The introduction of a set of complementary dimensions according to which some ISCED levels can be subdivided is the most consequential change introduced by ISCED 97. These sub-dimensions serve to facilitate classification and achieve more pertinent statistics. However, these sub-dimensions are often ignored or users of the classification are not aware of them (e. g. Körner and Meyer, 2005, p. 15). Therefore, they are described here in some detail. There are four complementary dimensions, namely

1. Type of programme/type of subsequent education or destination;
2. Programme orientation;
3. Cumulative (theoretical) duration since the beginning of a specific ISCED level; and
4. Position in the national degree and qualification structure.

ISCED levels 0, 1 and 6 do not have any complementary dimensions. Table 2.1 shows, in the last column, which complementary dimensions apply to which ISCED levels.

TYPE OF PROGRAMME/OF SUBSEQUENT EDUCATION OR DESTINATION

This complementary dimension is denoted by capital letters A, B and C and occurs at ISCED levels 2, 3, 4 and 5. These letters have a somewhat different meaning at each level: type of subsequent education or destination

TABLE 2.1: Criteria for classifying educational programmes by ISCED 97 levels of education

How to determine the level of a programme: Proxy criteria for contents Main criteria	Subsidiary criteria	Name of the level	Code	Complementary dimensions
Educational properties; School or centre-based; Minimum age; Upper age limit	Staff qualification	Pre-primary education	0	None
Apprenticeship of reading, writing and mathematics	Entry into the nationally designated primary institutions or programmes Start of compulsory education	Primary education/ First stage of basic education	1	None
Subject presentation; Full implementation of basic skills and foundation for lifelong learning	Entry after some 6 years of primary education; End of the cycle after 9 years since the beginning of primary education; End of compulsory education; Several teachers conduct classes in their field of specialization	Lower secondary education/ Second stage of basic education	2	Type of subsequent education or destination; Programme orientation
Typical entrance qualification; Minimum entrance requirement		(Upper) secondary education	3	Type of subsequent education or destination; Programme orientation; Cumulative duration since the beginning of ISCED level 3
Entrance requirement; Content; Age; Duration		Post-secondary non tertiary education	4	
Minimum entrance requirement; Type of certification obtained; Duration		First stage of tertiary education (not leading directly to an advanced research qualification)	5	Type of programmes; Cumulative theoretical duration at tertiary; National degree and qualification structure
Research-oriented content; Submission of thesis or dissertation	Prepare graduates for faculty and research posts	Second stage of tertiary education (leading to an advanced research qualification)	6	None

Source: UNESCO 1999, p. 8, Table 2; identical to UNESCO 2006 [1997], p. 19, Table 1.

at levels 2 to 4, and type of programme at level 5. Since the sub-categories at levels 3 and 4 are defined by their relationship to the sub-categories at ISCED level 5 and the sub-categories at level 2 with reference to the sub-categories at level 3, the sub-categories are set out here from 'top' to 'bottom'.

ISCED 5A programmes are higher education programmes that are largely theoretically based. These are generally university studies, but equivalent studies at polytechnic colleges or universities of applied science that lead to an academic degree are also included. ISCED 5B programmes in contrast cover tertiary *vocational* education programmes of at least 2 years duration that prepare for direct entry into the labour market. They are thus rather practical in scope and more occupationally specific than type A programmes. These are generally sub-degree level courses, which are often based on previous vocational training or technical upper secondary education. It can be very difficult to draw the line between type A and type B programmes at level 5. The minimum criteria for classifying a programme as 5A are a minimum duration of studies of 3 years, ISCED level 6 as the typical qualification for faculty involved in teaching, and 5A studies either lead to access to studies for an advanced research qualification (ISCED 6) or to professions with high skills requirements, such as medical doctors or lawyers.

At ISCED level 4, the OECD manual diverges from the UNESCO's conceptualisation. According to UNESCO, ISCED 4A programmes prepare for entry to ISCED level 5, irrespective of type of programme. Programmes classified as ISCED 4B in turn do not give access to tertiary education, but are designed for direct labour market entry. In contrast, the OECD proposes to use category 4A only for programmes preparing for ISCED 5A, and 4B for programmes preparing for ISCED 5B. Programmes classified as 4B in the UNESCO version are classified as 4C in the OECD version.

At ISCED level 3, 3A are "programmes (...) designed to provide direct access to ISCED 5A", 3B "programmes (...) designed to provide direct access to ISCED 5B" and 3C "programmes (...) not designed to lead directly to ISCED 5A or 5B. Therefore, these programmes lead directly to the labour market, ISCED 4 programmes or other ISCED 3 programmes" (UNESCO, 2006 [1997], p. 31).[24]

For ISCED level 2, 2A programmes are "programmes designed for direct access to level 3 in a sequence which would ultimately lead to tertiary education, i. e. entrance to ISCED 3A or 3B"; 2B "programmes designed for direct access to level 3C" and 2C "programmes primarily designed for direct access to the labour market at the end of this level" (UNESCO, 2006 [1997], p. 25).

Programmes denoted as *C* can thus be said to generally contain 'terminal programmes' that prepare for labour market entry. Programmes in sub-category *B* give access to at least one higher level of education, but exclude access to the mostly general/academic programmes 3A and 5A (except 4A, which is largely used for second-chance programmes for gaining access to university and can thus be accessed from ISCED 3B and 3C). Programmes in sub-category *A* (apart from 4A) contain the most direct path up to the highest level of education, i. e. the doctorate, and thus include traditional academic/general education (but not exclusively so).

PROGRAMME ORIENTATION The second complementary dimension is programme orientation, which is used at ISCED levels 2, 3 and 4. *General education* (abbreviated to 'g' as in *3Ag*) "is mainly designed to lead participants to a deeper understanding of a subject or group of subjects, especially, but not necessarily, with a view to preparing participants for further (additional)

24 The OECD version of ISCED level 4 is thus more consistent with the use of the sub-dimension *programme destination* at ISCED level 3.

education at the same or a higher level" (UNESCO, 2006 [1997], p. 25). General education is school based. In countries where on-the-job training is the typical mode of achieving practical skills, general education is regarded as appropriate for labour market entry. In other countries, where vocational training is largely provided in the educational system, this is not the case.

Pre-vocational or pre-technical education (abbreviated 'p' as in *2Bp*) "is mainly designed to introduce participants to the world of work and to prepare them for entry into vocational or technical education programmes" (UNESCO, 2006 [1997], p. 26), but does not yet lead to a full labour market relevant qualification. The proportion of vocational and technical contents should be at least 25 % for classification as pre-vocational or pre-technical. This type of education is however rather rare, and the ISCED mappings do not contain many programmes designated to fall in sub-category 'p'.

Vocational or technical education (abbreviated to 'v' as in *3Cv*) "is mainly designed to lead participants to acquire the practical skills, know-how and understanding necessary for employment in a particular occupation or trade or class of occupations or trades" (UNESCO, 2006 [1997], p. 26). Such qualifications are directly relevant for the labour market and usually recognised by a country's employers' associations. The importance of vocational programmes as well as the specific organisation of vocational training and their vocational specificity varies a lot across countries.

Programme destination and *programme orientation* tend to overlap (i. e. 'A' is mostly general education, 'B' pre-vocational and vocational, and 'C' mostly vocational). However, the degree of overlap differs across countries: In countries with an 'open' educational system (e. g. Finland, Sweden, the United Kingdom and Central and Eastern European countries), where vocational

education may also lead to subsequent general/academic education, vocational education is included in subcategory 'A' in terms of *programme destination*.

PROGRAMME DURATION The cumulative theoretical duration (in full-time equivalents) since the beginning of ISCED level 3 or 5 is used to make additional differentiations within ISCED 3C and ISCED 5A programmes. It is also used in order to determine if a programme should be classified as ISCED level 3 or 4.

Within ISCED 3C, the UNESCO distinguishes between programmes with less than six months duration, six months to one year, one to two years, and more than two years. In order to identify what counts as ISCED level 3 *completion*, the OECD distinguishes 3C programmes that have a duration comparable to the cumulative duration of 3A and 3B programmes in the respective country from programmes that are significantly shorter (i. e. by more than one year) (OECD, 1999, p. 42). EUROSTAT however differentiates 'short' and 'long' ISCED 3C programmes using an absolute cut-off of three or two years duration in the EU-LFS, depending on the year of the survey (Eurostat, 2006a, 2008d). This distinction is important because for graduation and attainment, short 3C programmes do not count as ISCED level 3 completion so that individuals who complete such programmes should be included in level 2.

At ISCED level 4, the OECD uses cumulative duration since the beginning of ISCED level 3 to decide if an educational programme should be classified as ISCED 4 when ISCED 3C is the minimum entry requirement: If the cumulative duration of the 3C programme and the programme in question is more than the duration of the typical 3A or 3B programmes in the respective country,

it should be assigned to ISCED level 4; otherwise it should be put into ISCED level 3.

At ISCED level 5, cumulative duration is a very important additional criterion to distinguish between 'lower' and 'higher' degrees. Cumulative duration is calculated by adding up the duration of consecutive programmes. The sub-categories distinguished by the UNESCO are

1. Two and less than three years (not used for ISCED 5A since 5A programmes have a minimum duration of three years by definition);
2. Three and less than four years;
3. Four and less than five years;
4. Five and less than six years; and
5. More than six years.

The OECD uses somewhat less detailed sub-categories: 'short' (two to less than three years); 'medium' (three to less than five years); 'long' (five to six years); and *very long* (more than six years).

POSITION IN THE NATIONAL DEGREE STRUCTURE Tertiary education is marked by an internal structure of qualifications in many countries, and the Bologna process implements such a structure in all EU member states (and other participating countries) since the Bologna declaration in 1999 (The European Ministers of Education, 1999). Since this declaration was signed *after* the adoption of ISCED 97, the Bologna reforms are not reflected in the revised ISCED framework. In countries with an undergraduate/postgraduate split, the first degree is an important transition point, and only a second ISCED 5A degree gives access to ISCED level 6.

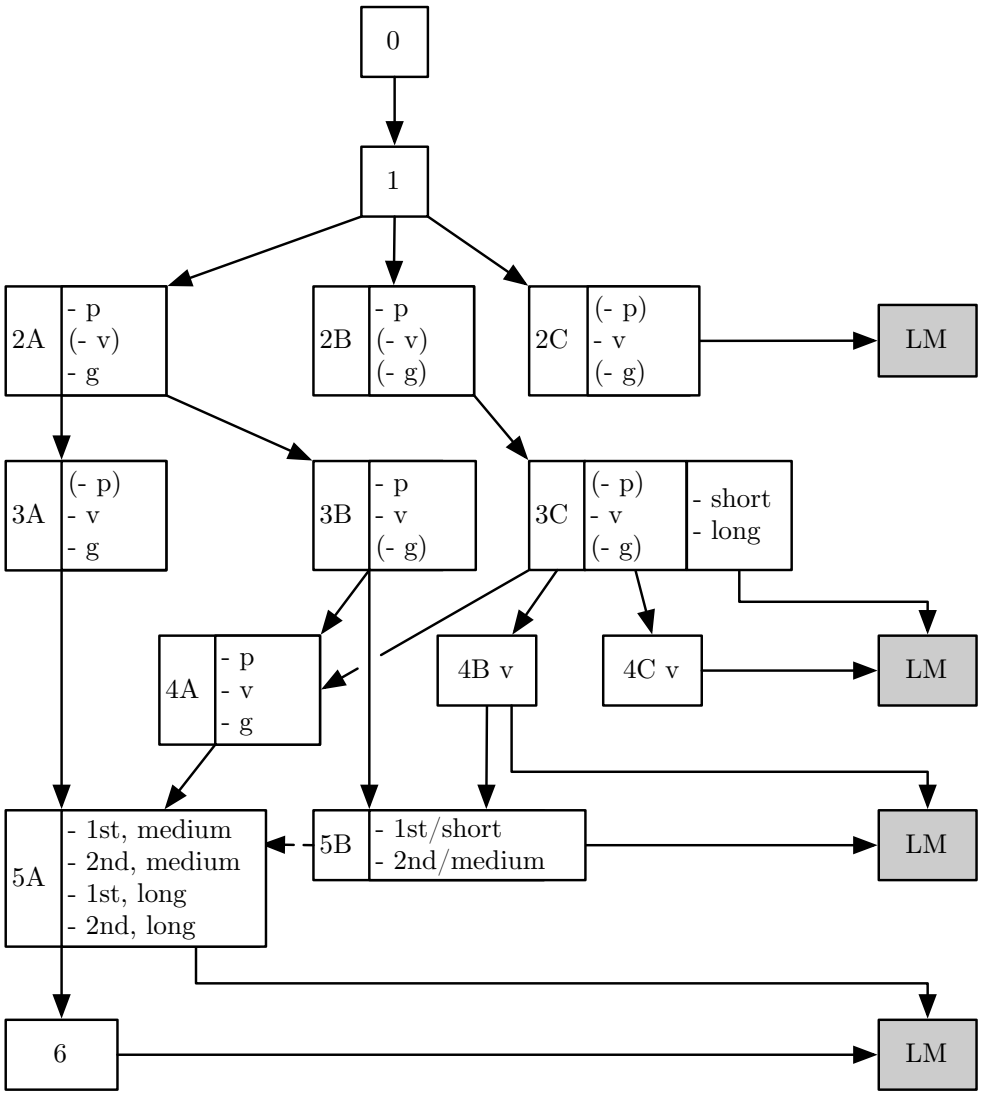
This is picked up by the sub-dimension *position in the national degree structure* in ISCED 97. The internal structure thus refers to the division between undergraduate and postgraduate studies, concluding with a first and second degree respectively (or even further degrees). ISCED 5A *second* programmes

require the completion of an ISCED 5A *first* programme, and should have a significantly higher level of content than first-degree programmes. A differentiation between first and second qualifications is also drawn (but, upon inspection of the ISCED mappings, much less used) within ISCED 5B.

Many European countries did not have such a structure before the Bologna process kicked in, and their first degrees would have been equivalent to second degrees in countries that used to have this distinction already before the Bologna reforms. For example, British Bachelor's degrees, the French *Licence* and the German *Diplom* and *Magister* are all first degrees, but the German degrees take longer and accordingly cover a higher level of educational content than the first degrees in France and the United Kingdom others.

OECD (1999) adds 'intermediate' qualifications to the qualification structure in ISCED 5A. This category does not count as *completion* of ISCED 5A, but covers the initial years of a longer 5A programme that conclude with a separate examination (e. g. the *Diplôme d'Études Universitaires Générales* (DEUG) in France; or *Zwischenprüfung* or *Vordiplom* in Germany). From a human capital perspective, it is important to include the attainment of such a level of education separately from the previous (usually 3A) and later (5A first) qualifications (OECD, 1999, p. 54).

Figure 2.2 shows the transition pattern and typical educational paths taken through educational systems in terms of ISCED 97. It builds on the transition pattern given by UNESCO (2006 [1997], p. 18), but is slightly adapted to the OECD's version of ISCED, including the additional subcategory 4C, and also visualises the most important sub-categories. It should be noted that the arrows shown are simplified and only reflect 'minimal entry requirements'. This means that although no arrow is drawn between e. g. ISCED 3A and



Note: LM=Labour Market.

FIGURE 2.2: ISCED 97 transition pattern according to OECD

ISCED 5B, this path is possible in most countries, as 3A is usually regarded as a higher qualification than 3B, and qualifications are seen as 'downward compatible'.

As the previous sections and Figure 2.2 reveal, ISCED 97 is a very complex classification. Its application to actual data from different countries is by no means straightforward, and cannot be. In order to facilitate the application, the UNESCO has prepared an operational manual, which gives "specific and operational instructions. Without them, no individual country, no

matter how strong its intention to facilitate international comparisons, is in a position to determine whether its method of assigning programmes to international categories is compatible with the methods of other countries" (UNESCO, 1999, p. 11). It is therefore necessary that everybody who is responsible for the coding of CSEVs into ISCED 97 is familiar with this operational manual and the manual provided by the OECD (including the mapping tables for the single countries).

2.3 ONE CONCEPT, ONE OPERATIONALISATION OF EDUCATIONAL ATTAINMENT?

Given the different ranges of countries and research areas involving education as a central variable, the actual concepts and measures of education used in the studies cited throughout Section 2.2 differ greatly—it is in fact difficult to identify any two studies that operationalise educational attainment in the same way.

It should be clear by now that there are different perspectives one can take with respect to the conceptualisation and measurement of educational attainment: One size won't fit all. For measuring level of education as a widely recognized *qualification* and looking at economic returns to education as a signal, researchers need information on the highest educational certificate the respondent has achieved. For measuring level of education in terms of socialisation and investment in education, it is the highest level and potentially type of education (e. g. general or vocational) attended, irrespective of the formal certificate achieved, that needs to be covered in the data. Both the highest level attended and level of the highest certificate achieved can, but need not be, the same for any given individual: Individuals often enrol in an educational programme without graduating, either because they drop

out before the end of the programme, chose not to take the final examination or fail it. Furthermore, there might be differences between countries in the overall incidence of such discrepancies between level of education *attended*, *completed* and *certified*. In France for example, selection does not so much depend on admission procedures, but on highly competitive examinations, so that there is a rather high discrepancy between the proportion of people who complete a certain level of education and the proportion of people who also achieve the respective certificate. Figure 2.3 shows how these concepts are nested within each other, with 'grade/educational programme attended' being the widest and 'certified successful completion of grade/educational programme' being the narrowest one. The unit of measurement differs across these definitions of educational attainment: in the first two cases, it is the educational programme or grade, in the last case it is the certificate.

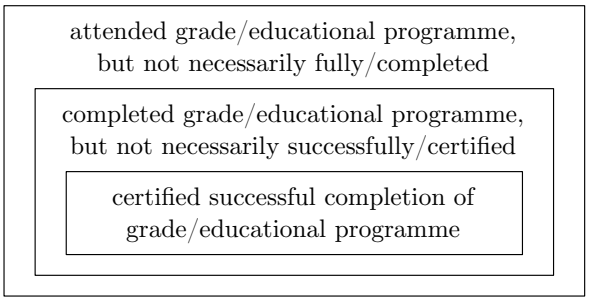


FIGURE 2.3: Scope of different concepts of educational attainment

Figure 2.4 visualises how measures of educational attainment are derived, similar to the more general depiction in Figure 2.1. Since human capital, possibly extended by the aspect of signalling, is the construct underlying most theories on the effects of education, it is given as the example construct here (but others would be possible).

Whereas *actual years of education* could be considered to capture the investment in education, *hypothetical years of education* come closer to an output

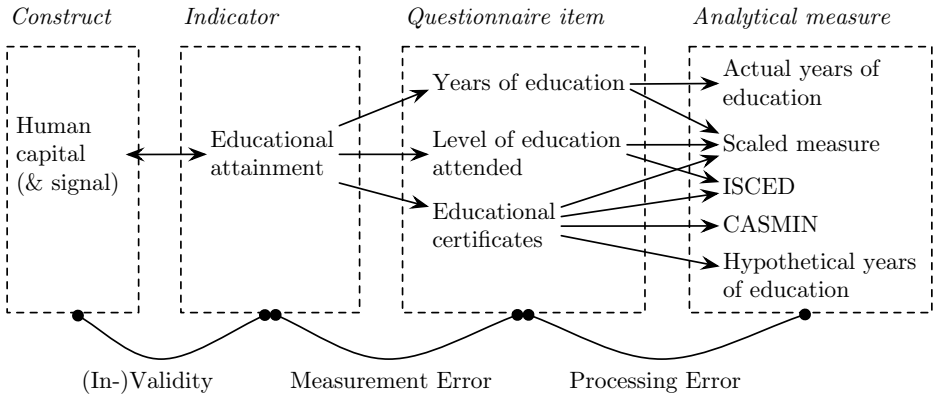


FIGURE 2.4: Operationalisation of human capital

measure. In contrast to *years of schooling*, using a categorical variable, it is possible to measure *what type* of education (vocational, technological or academic) an individual attended or achieved, and to take the signalling character of formal qualifications into account. This idea is fundamental to the CASMIN scheme and, to a lesser degree, to ISCED 97.

The basic idea of both international classifications of education, ISCED 97 and CASMIN, is to provide a framework with which national classifications can be 'translated' into an internationally standardised classification. The challenge is to "apply the most precise educational classification that can still be considered as a 'common denominator' to the respective countries involved" (Brauns et al., 2003, p. 242). Such a framework might be based on a set of definitions for the categories of the international classification (which can be more or less explicit) like CASMIN, or provide explicit definitions *plus* detailed mappings linking national educational programmes (as the basic unit of classification) to internationally comparable categories, like ISCED 97. Both CASMIN and ISCED 97 basically distinguish between primary, secondary and tertiary education, and then differentiate further within these levels. Not only are such measures more meaningful (especially in European societies with highly differentiated and stratified educational systems) than *years of*

education, but they can usually also be derived from national educational attainment measures available in virtually all social surveys.

The main problem with using CASMIN for comparative research today is that it has only been applied to a limited number of countries in the past, that there are no formal guidelines for its implementation in other countries, and that it is not systematically updated on a regular basis due to lacking institutional backing. There is also generally not much documentation available on CASMIN. The advantage of the CASMIN scheme is that it was specifically developed for the purposes of social stratification and mobility research and is academically driven. Compared to CASMIN, one of the biggest advantages of ISCED 97 is the availability of background information and documenting material, especially the ISCED mapping tables (Eurostat, 2005; OECD, 1999).

A shortcoming of both categorical measures of educational attainment is the neglect of dropouts or exam failures (see also Brauns et al., 2003). People who drop out of an educational programme or fail the examination requirements are therefore classified at their last successfully completed level of education, despite the fact that they might have spent a substantial amount of time in the educational system after achieving that level.

3

PREVIOUS EVALUATIONS OF MEASURES OF EDUCATIONAL ATTAINMENT FOR CROSS-NATIONAL RESEARCH AND EVALUATION CRITERIA

The previous chapter described measures of educational attainment commonly applied in cross-national research. This chapter will review the literature concerning evaluations of these measures and conclude by synthesizing the gaps in current research and evaluation criteria chosen for the remainder of the study.

In the first section, the available *cross-national* evaluations of educational attainment measures will be reviewed. As a next step, I will briefly discuss selected studies evaluating different ways of measuring educational attainment in *country-specific* studies. In the last two sections of this chapter, open questions concerning the quality of measures of educational attainment arising from this review will be summarised, and evaluation criteria for the main parts of the study (Parts II and III) will be presented.

3.1 PREVIOUS CROSS-NATIONAL STUDIES EVALUATING EDUCATIONAL ATTAINMENT MEASURES

Not many studies have been conducted to evaluate the quality of measurement of educational attainment in comparative research. Quite some of them

belong to the 'grey' literature: these studies represent preparatory or background work that is conducted for international organisations or survey organisers and hardly ever published in academic journals.

Cross-national studies evaluating the measurement of educational attainment cover two different issues: 1. The consistency of the distribution of educational attainment across data sources (Dourleijn et al., 2000; Hoffmeyer-Zlotnik and Warner, 2007; Hudson, 2007; Kolsrud and Skjåk, 2005) and 2. the loss of information (and thus explanatory power) coming about by harmonisation (Braun and Müller, 1997; Kerckhoff and Dylan, 1999; Kerckhoff et al., 2002).

3.1.1 *Consistency of educational attainment distributions*

Inconsistencies in the educational attainment distributions within countries across data sources (using the same cross-national coding scheme, usually ISCED) could hint at differences in the underlying data generation processes, especially in the exact way in which CSEVs are harmonised into the cross-national scheme. Given the complexity of the ISCED 97 and the fact that the available information sources (such as the ISCED mappings) are not widely known, misclassifications of country-specific education categories in ISCED categories are quite probable. This can especially be expected to be a problem when the data are coded by non-experts, as is the case e. g. in the ESS (Hoffmeyer-Zlotnik and Warner, 2007).

Dourleijn et al. (2000, p. 8) report large variations across countries in the distribution of educational attainment according to an aggregated three-level ISCED version[25] for women born between 1953 and 1967 in the Fertility and

25 The three-level version of ISCED 97 distinguishes ISCED 0 to 2 (low level of education), 3 and 4 (medium/upper secondary level of education) and 5 and 6 (high/tertiary level of education).

Family Surveys (FFS) for 17 European countries that according to the authors do not match the distributions published in the EUROSTAT yearbook (Eurostat, 1996) for the same population. They also notice that there are no clear regional patterns in the distributions of educational attainment. However, the official reference data are not shown side by side with the FFS data, so that it is hard to tell what the authors mean by 'large' variations and inconsistencies.

With respect to the EU-LFS, Eurostat (2007c) notes that most countries' NSIs report that they have never compared the educational attainment distributions produced by their Labour Force Survey (LFS) with outcomes of the UOE data collection or other external data sources. Hudson (2007) examines absolute differences between OECD's "Education at a Glance" Series (EAG), usually derived from national LFSs and used as a standard of comparison, and a number of academically driven and OECD sample surveys (ISSP, ESS, WVS, IALS and ALL) in the distribution of ISCED 97. The purpose of this study is to investigate the quality of survey data sources for the development of OECD indicators on the *social outcomes* of education, for which LFSs are unsuitable. For these comparisons, again a three-level version of ISCED 97 is used.

In most countries, the surveys report more cases in the 'low education' category and fewer cases in the 'medium education' category than EAG. In the ISSP, a number of countries also show considerably more respondents with 'tertiary education' as compared to EAG. The differences are quite large in a few countries, amounting to e. g. a difference of around 60 percentage points in the 'low education' category for the United Kingdom (UK) in the WVS, Switzerland (CH) in the ALL and Germany (DE) in the ISSP. Czech Republic (CZ), DE and the UK repeatedly turn up as the countries with the lowest match with EAG data.

The distributions in the ESS are closer to EAG overall than those in the ISSP or WVS, which could be explained by the fact that the ESS decided to use ISCED 97 as the cross-national coding scheme for educational attainment at the outset (for more details, see Section 4.1.1). The OECD sponsored surveys (IALS and ALL) also fare better than the academically driven ones. Hudson (2007) suggests three potential sources for these inconsistencies: 1. Non-comparability of samples, possibly exacerbated by the rather small sample sizes of social surveys as compared to LFSs;[26] 2. unreliability of the educational attainment measures used, e. g. because of differences in the question wording across surveys; and 3. differences in the harmonisation procedures, i. e. coding of the CSEVs into ISCED 97.

Hudson (2007) checked the IALS data with respect to the first issue by comparing the distributions of age, sex, number of individuals in the household, labour force status etc. with the distributions of these variables in LFS data. From this comparison, the author infers that "sampling in general is not the reason the education attainment variable in IALS differs from that reported in EAG [...] Moreover, the distributions for non-education variables are closely aligned both in countries for which education attainment data are aligned and in countries for which education attainment data are not aligned, suggesting that the mis-alignment seen in the education variable does not result from a sampling problem" (p. 9). As can be seen by the enormous reduction in the discrepancies when recoding the IALS source data into ISCED 97 (p. 7–8), the third issue seems to have a big influence on the consistency of educational attainment data in different surveys. Hudson (2007) thus overall concludes that these findings "reiterate the importance of the national-coding-to-ISCED transition process, and further support the conclusion that

26 The author does not mention bias because of item non-response, possibly because item non-response is not very common for educational attainment variables (see Section 4.1).

something specific to the coding of the education attainment variable (rather than sampling) is the main source of the discrepancies between international surveys and EAG" (p. 9). This is not checked any more in this paper.

Both Kerckhoff and Dylan (1999) and Kerckhoff et al. (2002) also come to the conclusion that ISCED is not always implemented in IALS in the way recommended by the OECD. A closer look at table 1 in Hudson's the paper (p. 11) allows us to speculate as to what might have gone wrong and why a low level of attainment is overestimated in the non-LFS data. With respect to DE in the IALS, vocational upper secondary education is either misclassified as 'low' education rather than 'medium' *or* not covered in the data, so that respondents are assigned to their highest level of *general* education, which would be 'low': there are far too few respondents in the 'medium' category. Something similar might have happened in CZ and Poland (PL), especially with respect to differential classification of vocational programmes as *short* or *long* 3C programmes in different surveys. The difficulties in the treatment of upper secondary vocational education could also be explained by the reluctance of data coders to aggregate vocational and general educational attainment categories at the upper secondary level in one international category, which is understandable given the actual differences between the respective qualifications. For the UK, the overrepresentation of 'low' educated individuals in the IALS can probably be explained by differences in the ISCED mappings applied since the boundary between ISCED levels 2 and 3 is disputed for the UK (see Schneider, 2008a).

There is also some initial evidence of the bridging of CSEVs into ISCED in the ESS from Kolsrud and Skjåk (2005) and Hoffmeyer-Zlotnik and Warner (2007). Hoffmeyer-Zlotnik and Warner (2007) find differences in the distribution of educational attainment according to a six-level version of ISCED (sum-

marising levels 0 and 1) between the ESS and published EAG data (OECD, 2006) for DE, Denmark (DK), France (FR) and Luxembourg (LU). For LU and FR, these differences can be attributed to misclassifications by the Luxembourgish and French ESS teams because the source data are available in the ESS. The authors however do not quantify these differences either, and only examine these four countries out of the 30 countries for which ESS data are available.

Kolsrud and Skjåk (2005) in their discussion of the harmonisation of background variables in the ESS find difficulties in the differentiation of primary and secondary education as well as inconsistent use of the two categories for tertiary education in the three countries they examine (Belgium (BE), Israel (IL) and Sweden (SE)), not in line with the UNESCO's documentation of ISCED 97 (UNESCO, 2006 [1997]). One problem seems to lie in the delineation of primary and secondary education. Another problem that occurred in a number of ESS countries and was examined by Kolsrud and Skjåk (2005) is where to draw the line between ISCED level 5 and 6. Kolsrud and Skjåk (2005, p. 172) conclude that "national teams don't necessarily have a shared understanding of the product (common frame) variable, even when the categories of the product variable are well defined".[27]

To summarise, only very little systematic evidence exists so far concerning the consistency across surveys and countries in the application of ISCED 97 to CSEVs. However, the few studies that made such comparisons usually find substantial discrepancies in the distribution of educational attainment across data sources and recommend to find the *causes* of these discrepancies. Apart from Hudson (2007) checking the comparability of the different samples,

27 As a consequence of these issues, the authors suggest a "centrally coordinated review of the national input instruments and the national bridging into the common ESS coding frame" (Kolsrud and Skjåk, 2005, p. 176). A Quality Enhancement Meeting for the educational attainment measure in the ESS is scheduled for October 2009.

none of the studies makes a systematic attempt at tracing the sources of the inconsistencies in terms of data generating processes.

3.1.2 *Studies on the loss of information through harmonisation*

Next, cross-national studies that examine the loss of information through harmonisation of CSEVs into cross-national education variables are to be discussed. Kerckhoff and colleagues published two articles concerning the evaluation of ISCED 78 and the CASMIN education scheme for a small number of countries, namely Great Britain (GB), DE, the Netherlands (NL), SE and the United States (US) on the one hand (Kerckhoff and Dylan, 1999) and GB, NL and the US on the other (Kerckhoff et al., 2002). Braun and Müller (1997) performed a similar evaluation for the US, DE, PL and Hungary (HU), covering CASMIN, years of schooling and a very basic three-category scheme.

The methodological rationale of the analyses performed in these studies was that there are two sources of systematic variation in the association between educational attainment as given by a cross-national measure and other (outcome) variables (e. g. occupational status) over countries: Firstly, the 'true' association between educational attainment and the chosen outcome variable may differ over countries—this is what researchers are usually interested in. Secondly, different cross-national measures of educational attainment reflect the 'true' level of educational attainment to different *degrees*. Therefore, the strength of the association between educational attainment and the outcome variable will also depend on which specific (cross-national) measure of educational attainment is used. The strength of association was in all these studies measured by the R^2s resulting from regressions of the outcome variable on different education measures.

The information content of different measures of educational attainment can be evaluated by comparing the association of these measures with a given outcome *within* countries. The association of the outcome with a *country-specific* education measure can serve as a benchmark. Furthermore, the variation in the information content of different measures of educational attainment *across* countries can give valuable information on how adequate the different measures are in different national contexts.

Braun and Müller (1997) use a relatively wide set of outcome variables (including e. g. gender attitudes and personal income) to evaluate CASMIN, *years of schooling* and a basic three-category scheme. In all countries but the US, *years of schooling* were (sometimes considerably) less strongly associated with the outcome than the country-specific education variable, regardless of the outcome variable chosen. Using CASMIN resulted in less—but still sometimes undesirable—loss of predictive power. The minimal three-category scheme showed the weakest performance of all measures, illustrating "how much information we lose by using increasingly unrefined measures of education" (Braun and Müller, 1997, p. 177). An interesting additional benefit of this study is that for DE, two country-specific categorical measures of educational attainment are used: one that includes vocational training, and another one that does not. The results show that the inclusion of vocational training can be crucial since it explains a lot of variation in some of the outcome variables and is a core pillar of the German educational system.

For the evaluation of ISCED 78, Kerckhoff and Dylan (1999) used data from the IALS for GB and the US. They compared the R^2s resulting from the regression of occupational prestige scores (Treiman, 1977) and cognitive test scores on educational attainment measured in three ways: 1. Using ISCED 78

as implemented by the national researchers, 2. using ISCED 78 as recommended by the OECD, and 3. using the country-specific educational attainment classification. The latter was used as a benchmark. The authors summarised the results as follows (Kerckhoff and Dylan, 1999, p. 770):

> 1. "Relatively minor changes in the classification of the indigenous credentials into standard categories (in this case ISCED categories) can alter the associations between educational attainment and both occupational prestige and cognitive skill.
> 2. Both constructions of standard categories underestimate the associations between educational attainment and two important outcomes (occupational prestige and cognitive skill).
> 3. Underestimation is much greater in one country (GB) than in another (the US).
> 4. The different underestimates lead to misleading impressions of the relative importance of educational attainment in the two countries by making the differences look larger than they actually are."

The comparison of CASMIN and ISCED 78 in Kerckhoff et al. (2002), also relying on IALS data but using (crude) occupational prestige and International Socio-Economic Index (ISEI) scores as outcome variables, shows that in GB and NL, CASMIN performs better than ISCED 78. This is because ISCED 78 does not differentiate between vocational and general education at the different levels; a distinction which is considered to be very important in many European countries, but not so much in the US. In the US in turn, ISCED 78 works better because it distinguishes between first and postgraduate degrees, a distinction that is not important in European countries (before the Bologna reforms). Thus the reclassifications imposed by either international framework are not equally (in-) adequate in all countries. It is also noted that neither CASMIN nor ISCED 78 offer enough categories to adequately represent all important distinctions in educational credentials. Kerckhoff et al. (2002) thus suggest a refinement of the CASMIN scheme that more or less

corresponds to the differentiations already proposed by Brauns and Steinmann (1999), which actually appears to work much better in the US and also slightly better in GB than the original CASMIN scheme.

Finally, Kolsrud and Skjåk (2005) find differences within ISCED levels between technical and general lower secondary education with respect to attitudes towards immigrants in NL. The conclusions thus resemble those by Braun and Müller and Kerckhoff and colleagues: the aggregation of subcategories can lead to a loss of important characteristics of the data. Kolsrud and Skjåk (2005) thus recommend to complement cross-national statistical analyses using the comparable variable by country analyses using the CSEV. However, Kolsrud and Skjåk (2005) do not study the effects of harmonisation for other countries in the ESS in a similar way, although this is in principle possible with the ESS data.

To summarise, differences in analytic procedures, concept specifications and measurement often prevent valid comparisons. "This difficulty has, in fact, been common to all attempts at comparative research on social mobility and the process of status attainment, with the result that it has heretofore been impossible to distinguish between true differences in social structure and differences resulting from variations in measurement procedures" (Treiman and Terrell, 1975, p. 564–565). As shown in this brief review of the literature, this is even true with harmonised measurement, because the harmonisation process masks differences between countries that are highly relevant to the process being studied.

Therefore, "the important conclusion to be reached is that the way in which the standard categories are constructed from the indigenous categories *can* make a major difference in the kinds of results that are produced in comparative research" (Kerckhoff and Dylan, 1999, p. 769, italics in the original).

Specifically the level of detail and homogeneity of harmonised education categories are influential in the cross-national comparability of educational attainment measures. When measures of educational attainment are simplified by reducing the number of categories, it can happen that variation on the education variable is reduced to such a degree that its associations with other variables are strongly attenuated. This means that if we include educational attainment in some statistical analysis and the measure of educational attainment is highly simplified, we in fact only very partially control for educational attainment. This can change the results of the statistical analysis from those that would be achieved with a detailed measure, and thus the conclusions drawn from the analysis. Therefore, "What we want ... is the best measure of the concept in question for a particular country rather than a standard measure that is more appropriate in some countries than in others (and will therefore show weaker relationships in some countries than in others)" (Heath et al., 2005, p. 321). In order to allow the construction of detailed cross-national educational attainment variables, it is therefore recommended to collect data in sufficient detail, also having in mind that educational systems continue to change and thus measures will have to adapt to these changes accordingly (Braun and Müller, 1997).

3.2 PREVIOUS STUDIES EVALUATING DIFFERENT EDUCATION MEASURES WITHIN COUNTRIES

Which measure of education to use—a continuous one like *years of education* or a categorical, credential based one—is of course not only an issue in cross-national research. Especially in the US, there was a debate around the existence (or not) of a so-called 'sheepskin effect',[28] i. e. if educational

28 Educational certificates used to be made of sheepskin in the US.

certificates have an effect on labour market outcomes over and above the effect of *years of education*. Such an effect is indicated by "disproportionately large increases in returns to schooling after the completion of certain years that usually entail a degree" (Park, 1999, p. 238). Reviewing the literature comparing the performance of different educational attainment measures *within* countries is a useful addition to the review of cross-national evaluations since country-specific studies can take a quite detailed look at how a specific educational attainment measure 'works'. Moreover, evidence on the malfunctioning of a specific educational attainment measure from an individual country would replicate itself for this country in cross-national studies.

Goodman (1979a) compares a number of specifications of the educational attainment effect on log earnings adjusted for full-time employment, using adjusted R^2s as the criterion to decide which specification explains earnings best. The data set is a public use sub-sample of employed native born white males between 15 and 65 years of age in the 1970 the US Census. The specifications include a linear effect of years of education, a level-specific effect (i. e. completion of a specific level of education, irrespective of the achievement of the respective certificate), a purely credentialist model, and combinations thereof (linear/credentialist and level-specific/credentialist). The results show that the combined level-specific/credentialist specification fits the data best: This means that the returns to schooling differ across levels of education (elementary, high school, college, postgraduate) and with the acquisition of the respective educational certificates (especially the achievement of a Bachelor's degree). Log earnings are thus best explained by educational attainment if the measure of attainment combines level based and

certificate based elements. The other models however come relatively close, especially the linear/credentialist and the level specific model.

Subsequent the US based studies also find evidence for sheepskin effects, usually in addition to positive effects of partial studies (Faia, 1981; Frazis, 2002; Heywood, 1994; Hungerford and Solon, 1987; Jaeger and Page, 1996; Park, 1999). With respect to the comparison of different measures of educational attainment for other countries, Antelius and Björklund (2000) also find this result for SE. Treiman and Terrell (1975) showed that with respect to GB, school leaving age fails to represent differentiations within groups of people who left school at the same age but had attended different institutions (grammar school or secondary modern school). For CH, it has also been shown that using 'years of education' rather than CASMIN leads to a substantial deterioration of model fit when predicting the prestige status of the first job and labour market entry class (Buchmann and Sacchi, 1998, p. 425).

Müller and Klein (2008) finally show in some detail why the three-level version of ISCED 97 does not well represent the structure of educational attainment in DE and thus leads to distorted substantive results on the intergenerational transmission of education: European Commission (2008b), based on EU-SILC data, reports that the dependence of individuals' educational attainment on their parents' attainment is lowest in DE among all EU member states, which is diametrically opposed to the results of the PISA studies (e. g. OECD, 2007) that throughout find rather strong effects of social origin on student achievement in DE. Again, the reasons can be sought in the high level of heterogeneity of the middle and high ISCED categories which lead the authors to conclude that "this three-level version [of ISCED, my addition] is such an undifferentiated, crude instrument that mixes up the incomparable that its use in this form should have been banned long ago" (Müller and

Klein, 2008, p. 52, my translation). The associations between parental and respondents' education is substantially higher in DE when a more adequate measure of educational attainment such as CASMIN is used.

3.3 OPEN QUESTIONS AND AIMS OF THIS STUDY

Previous evaluations of different measures of educational attainment, either studied in single countries or in a comparative context, reveal a number of problems in the measurement of educational attainment relevant to cross-national research. A relatively old statement by Treiman and Terrell (1975) is thus still valid today: As a consequence of these problems,

> "various analysts have drawn contradictory conclusions from the same data, a fact which underscores the point that numerical results may depend as much on measurement procedures as on social reality and that standardized measurement procedures are therefore a necessary prerequisite to the valid attribution of observed differences to differences in social reality. To be sure, standardized measurement procedures may mask as well as reveal true differences, but this problem is best resolved by refining measurement, not by muddling it" (p. 564, footnote 2).

Therefore, the aim of this study is to provide a comprehensive evaluation of the measurement of educational attainment in cross-national surveys. It will build on the previous studies evaluating cross-national measures of educational attainment cited in this chapter, using similar methods and try to fill some significant gaps:

First of all, there is hardly any systematic and large-scale evidence available on the consistency of educational attainment data across time, countries and data sets. It would therefore be worthwhile to 1. systematically quantify differences in educational attainment distributions over time and across data sources and 2. check the (in-)consistency of data collection instruments and

recoding decisions in different countries when harmonising country-specific into cross-national categories. This will be covered in Part II of this study, focussing on ISCED 97, since this is the measure used in most surveys today.

Secondly, the few studies comparing different cross-national measures of educational attainment using construct validation techniques are limited in scope in a number of ways: Since data using the *revised* ISCED were not available until recently, ISCED 97 has not yet been thoroughly evaluated by any study. The results reached by Kerckhoff and Dylan (1999) and Kerckhoff et al. (2002) using ISCED 78 might differ from those that would be achieved with ISCED 97 today: The major revision of ISCED undertaken in 1997 may have changed the performance of the measure. Therefore, these studies need updating.

Furthermore, although *years of education* are often used in cross-national research, only the study by Braun and Müller (1997) has evaluated the predictive power of *years of education* in a cross-national context. The studies also do not consistently distinguish between measurements of *actual* and *hypothetical years of education*. A comparison for ISCED and CASMIN for a wider range of countries is also still outstanding (Pfeffer, 2008, p. 7).

In addition, in terms of choice of outcome variables for construct validation, as the IALS data only included the major occupational categories of ISCO 88, the measures of occupational status and prestige used in Kerckhoff and Dylan (1999) and Kerckhoff et al. (2002) are very crude. This might have influenced the results, probably by 'underestimating the degree of underestimation' resulting from the harmonisation of educational attainment variables. So far no study has attempted to validate the results achieved with occupational status or prestige measures using *social class attainment* as the outcome variable either.

Finally, and most importantly, from the studies reviewed, it remains unclear if ISCED works 'equally bad' in all European countries (which would actually be better than differences between countries in the appropriateness of a cross-national measure) since these studies only cover a relatively small number of countries. We thus still lack knowledge about the effects of using comparable education measures in a wider range of countries, which is crucial for a real assessment of the comparability of educational attainment measures.

It would therefore be highly useful to check the performance of a wide range of harmonised educational attainment measures in recent cross-national surveys covering a wide range of countries. Filling these gaps is the aim of Part III of this study.

Taken together, Part II and Part III thus look at the comparability of educational attainment measures from different angles and focus on the different stages of research where problems emerge, ranging from data collection over coding and harmonisation to statistical analysis. This will conclude in a set of specific recommendations which will be presented in the final chapter of the study.

3.4 CRITERIA FOR THE EVALUATION OF CROSS-NATIONAL EDUCATIONAL ATTAINMENT MEASURES

Any cross-national measure of educational attainment must be reliable and valid *within* countries and comparable *across* countries. The goals of valid country-specific and at the same time cross-nationally comparable measurement "unfortunately work against each other. Greater comparability is

achieved through generality, and therefore at the cost of what is characteristic to each country. Finding a balance is not easy" (Brynin, 2003, p. 330).[29]

3.4.1 *Validity and reliability*

Carmines and Zeller (1979) discuss the two basic quality criteria for empirical measurement: validity and reliability. Validity refers to "the extent to which any measuring instrument measures what it is intended to measure" (Carmines and Zeller, 1979, p. 17). For example, does the measure capture the whole breadth and all aspects of the intended concept? It is "a theoretically oriented issue because it inevitably raises the question, 'valid for what purpose'?" (Carmines and Zeller, 1979, p. 16).

The authors distinguish three types of validity:

1. *Criterion validity* refers to the degree to which a measure correlates with an independent second measure of what it is supposed to measure (or predict). However, Carmines and Zeller (1979) note that "the most important limitation [of the concept of criterion validity, my addition] is that, for many if not most measures in the social sciences, there simply do not exist any relevant criterion variables" (p. 19), which strongly reduces the practical usefulness of the concept of criterion validity.
2. *Content validity* "depends on the extent to which an empirical measurement reflects a specific domain of content" (Carmines and Zeller, 1979, p. 20) and does not leave out any specific domain included in

29 Measurement quality is only one aspect of data and survey quality. The wider evaluation of data quality of cross-national social survey data (e. g. issues related to the coverage of sampling frames, availability of survey documentation, mode of data collection, experience of surveying organisations, interviewer training etc., Groves, 1989; Harkness, 1999; Heath et al., 2005; Lynn, 2003; OECD, 2003b) is however beyond the scope of this study. Therefore, the discussion in this section will restrict itself to measurement validity, reliability and comparability. Other aspects of data quality are mentioned in the study when relevant evidence is available.

the construct to be measured. For example, if for some country, not all dimensions of the construct are covered in its measurement, this leads to 'construct underrepresentation' (van de Vijver, 2003). In order to achieve content validity, "the researcher must be able to specify the full domain of content that is relevant to the particular measurement situation" (Carmines and Zeller, 1979, p. 20). Unfortunately, there is no rigorous way to assess content validity because there are no well-defined objective criteria for when content validity is achieved, partly because most concepts are not specified with the required exactness. The assessment of content validity thus relies on common-sense judgement to a substantial degree, which reduces its usefulness for the practical assessment of validity.

3. *Construct validity* "is concerned with the extent to which a particular measure relates to other measures consistent with theoretically derived hypotheses concerning the concepts (or constructs) that are being measured" (Carmines and Zeller, 1979, p. 23).[30] With respect to categorical variables, construct validity is e. g. negatively affected by 'aggregation error', which is the error coming about by the merging of categories. Construct validity is thus highly sensitive to the information content of measures. Since construct validity and aggregation error can be assessed empirically by correlating the measure to be evaluated with some outcome variable that can, by theoretical reasoning, be assumed to be closely related to the construct underlying the measure, it is the most common and practically useful way of establishing a measure's validity (Carmines and Zeller, 1979, p. 27).

30 Groves (2004) uses the term in a different sense that is closer to what Carmines and Zeller (1979) denote as criterion validity, stating that "construct 'validity' is the extent to which the measure is related to the underlying construct" (Groves, 2004, p. 50).

In turn, reliability is defined as "the extent to which an experiment, test or any measuring procedure yields the same results on repeated trials" (Carmines and Zeller, 1979, p. 11). A measure cannot be valid without being reliable. In contrast to validity, which implies systematic measurement error, reliability refers to *random* measurement error (Alwin, 2007; Carmines and Zeller, 1979). Reliability is usually assessed by correlating repeated or parallel measures of some construct (multiple measurement approach). However, this relies on strong and usually unrealistic assumptions, e. g. that the respondent does not 'remember' his or her response at the first measurement point (Alwin, 2007), and that there is no actual change. It is also very difficult to administer identical measures several times in one survey interview in a way that is acceptable for survey respondents. As an alternative, the *multiple indicator* approach and tests of internal consistency are often used. This has the disadvantage that we cannot separate exactly which part of the non-common variance across questionnaire items is due to unreliability and which part due to actual differences in the 'true values' on the indicators. A final way of checking (albeit aggregate) reliability is to compare summary statistics (e.g. the distribution) of some measure across data sources.

3.4.2 *Cross-national comparability*

For the purposes of cross-national or longitudinal research, the criterion of *comparability* must be added to the criteria of reliability and validity in the assessment of measurement quality: A measure can (theoretically) be perfectly reliable and valid, but yet incomparable across time-points or countries.[31] But what does cross-national comparability or equivalence mean?

31 Although many of the points made in this study apply to both spatial and time comparisons, the terminology used will be restricted to cross-national comparisons.

There are many different, sometimes partly overlapping, notions of equivalence used in the literature: Johnson (1998) counts no less than 52, ranging from 'cultural equivalence' to 'psychometric equivalence'. Most discussions of cross-national comparability or equivalence however relate to attitude or academic achievement scales or similar measures that are constructed from multiple questionnaire items and constructed through factor analytic models (e. g. Billiet, 2003; Billiet et al., 2002; Blasius and Thiessen, 2006; Braun, 2000; Davidov, 2009; Kankaras and Moors, 2009; Przeworski and Teune, 1966; Steenkamp and Baumgartner, 1998).

At a general level, cross-national comparability requires the validity and reliability of measurement to be highly similar across countries: If random or systematic measurement error differs (a lot) across countries, the comparability of cross-national statistics will be (very) limited. Aspects of comparability or equivalence of measurement can thus be derived by extending the notions of validity and reliability to the cross-national context.

In order to assess the reliability of educational attainment data at the *aggregate* level, in Part II, Chapter 4, educational attainment distributions from different data sources will be compared over time and across three cross-national European surveys. This will be referred to as 'consistency' of educational attainment measures in order to distinguish the assessment of aggregate measurement outcomes from the more specific meaning of reliability in psychometric terms.

With respect to comparability of validity, in order for comparisons across countries to be valid at the most basic level, the *construct* in question must exist and be equivalent across countries ('construct equivalence', Kuechler, 1987; Scheuch, 1968; van de Vijver, 2001). With respect to educational attainment, this pre-condition is fulfilled to at least some degree: In all countries

under study here, educational attainment can be assumed to be important as an indicator of human and cultural capital as well as, when indicated by educational qualifications, a signal of the successful acquisition of skills and/or third variables such as ability—even if this applies to different degrees in different countries. The question of *how* important educational attainment is for these underlying constructs and if there are differences across countries therein is then an empirical one.

The second condition of comparability is that the *content validity* of the measure employed is the same in all countries, which will be termed 'equivalence of content validity' here. Therefore, even if we cannot easily evaluate the content validity of a measure in one country (see Section 3.4.1), what *can* be assessed in this study is how far measures of educational attainment employed in different countries and surveys cover the *same* domain of content. For example, if construct underrepresentation occurs in some country, this measurement will not be comparable to the measurement in other countries.

Consistency of the underlying concepts, operationalisations and thus questionnaire items used in the country-specific data collection instruments for educational attainment is indicative of equivalence of content validity of the resulting measures. The equivalence of content validity of a measure lies in both the actual question wording as well as response options. In any comparative survey it needs to be made sure that all countries collect data on the same operational specification of educational attainment, e. g. years of education (in turn specified in an equivalent way), certified educational attainment or level of education attended or completed (or a combination of those).[32] If e. g. some countries collect information on the highest level

32 Also the application of ISCED differs slightly depending on the choice of either completed or attended educational programmes.

of education attended and others on the highest qualification achieved, the resulting data are not easily comparable.

The coverage of response categories also must be equivalent across countries. This means that countries have to in- or exclude educational programmes and qualifications from the same or equivalent segments of the educational system. If a country e. g. does not cover vocational education and training, whereas others do, this country cannot be compared to the others in terms of educational attainment. The same applies to adult education, foreign qualifications and non-formal education: It should be clearly specified in the survey regulations if such types of education are to be covered by the educational attainment instrument or not. The equivalence of content validity and consistency of data collection instruments will be examined in Chapter 5, Section 5.1. For this purpose, data sources, question wordings and response categories in the different surveys will be analysed.

In case that a cross-national classification of educational attainment is used for harmonisation, equivalence of content validity also depends on

1. the actual comparability of the categories in the cross-national classification across countries,[33] and
2. coding consistency, which means that the assignment of national education categories to international ones is performed in the same way in all countries.

The consistency of coding in harmonisation procedures will be discussed in Section 5.2.

33 A detailed discussion of the comparability of the ISCED categories themselves is beyond the scope of this study. This however was covered in a collaborative project covering 15 European countries (Schneider, 2008c). Although this is only a first step in the evaluation of ISCED 97 on conceptual grounds and in terms of comparability, this study showed that ISCED 97 is, with the exception of some assignments of national educational programmes to international categories for a few countries, an adequate classification for establishing cross-national equivalence of educational programmes and certificates.

The equivalence of content validity could be understood to underlie the common but usually undefined notion of 'nominal comparability'. Although this is an important precondition of comparability, it is however not sufficient. In addition to the equivalence of content validity, we also need *equivalence of construct validity*, which means that harmonised measures have to show a similar degree of construct validity across countries. Therefore, for cross-national research, attenuation of association because of simplified measures of educational attainment, i. e. lacking construct validity *within* countries because of aggregation error, is only one of the issues related to simplifying education measures. "An evaluation of a standard scheme ... does not depend on whether its use lowers the explanatory power of educational attainment. Rather, it depends on the size of the reduction and how consistently it occurs across societies" (Kerckhoff et al., 2002, p. 106). If, therefore, the attenuation of associations resulting from harmonising country-specific measures of educational attainment differs a lot across countries, not only construct validity is affected in those countries where the attenuation is large, but also comparability across countries is low. In contrast, if the chosen harmonised variable is detailed enough to mirror the most important educational differentiations with respect to some outcome variable in *all* countries covered by the survey, the cross-national measure can be regarded to display equivalence of construct validity. The size of the attenuation of association and differences across countries therein can be assessed by comparing the construct validity of the original (detailed) country specific and cross-national educational attainment measures. This will be performed in the empirical analyses in Part III, Chapter 7. Chapter 6 investigates the degree of variation of different categorical measures of educational attainment since this allows conclusions about the information content of these measures independent of an external construct.

Part II

CONSISTENCY OF CROSS-NATIONAL MEASURES OF EDUCATIONAL ATTAINMENT IN EUROPEAN SAMPLE SURVEYS

INTRODUCTION

In this second part of the study, the quality of the measurement of educational attainment will be examined with respect to the consistency across survey data sources. One of the requirements of data quality is the reliability or consistency over time and between different data sources. Reliability can be regarded as a necessary condition of valid measurement (Alwin, 2007, p. 16). Data inconsistencies are usually described in terms of random measurement error, although the errors do not need to be strictly 'random'. Random in this context means 'variable', i. e. the error differs across data sources and is in this sense not systematic. Such errors can however still be explained and thus potentially eliminated in many cases.

The importance of consistency or coherence across data sources, time and countries is also reflected in the quality guidelines of the OECD, which distinguish a number of sub-dimensions of coherence:

1. "Coherence across datasets implies that the data are based on common concepts, definitions and classifications, or that any differences are explained and can be allowed for. [...]
2. Coherence over time implies that the data are based on common concepts, definitions, and methodology over time, or that any differences are explained and can be allowed for. Incoherence over time refers to breaks in a series resulting from changes in concepts, definitions, or methodology. [...]
3. Coherence across countries implies that from country to country the data are based on common concepts, definitions, classifications and methodology, or that any differences are explained and can be allowed for" (OECD, 2003b, p. 10).

Consistency across time, data sources and countries can be achieved by setting up and following a precise methodology concerning data collection and processing, although some degree of random error will almost necessarily remain (Alwin, 2007). Many cross-national surveys, particularly those coordinated by official bodies, nowadays use the ISCED 97 as the underlying framework for measuring educational attainment. However, detailed guidelines on how to adapt and implement this classification for the measurement of educational attainment in cross-national surveys are lacking. It is therefore important to find out if there are major inconsistencies in its current use, so that researchers are aware of potential data quality issues. Moreover, detailed knowledge of the specific issues occurring will help developing guidelines to tackle these.

What are potential sources of differences in the harmonised educational attainment distribution across surveys, survey waves and countries? We can distinguish the following four broad groups of sources of inconsistencies:

1. Differences due to actual change over time (e. g. cohort replacement, educational reform, grade inflation) if data was collected at different time-points and due to actual differences across countries (e. g. educational institutions, selectivity, state of educational expansion);
2. differences between achieved samples due to coverage, sampling, mode of data collection, unit- or item-non-response and post-survey adjustment error (e. g. coverage of institutionalised populations, survey vs. register data; mail questionnaire vs. personal interview vs. telephone interview; sample size and composition, allowance of proxy reporting, weighting, see e. g. Groves, 2004, p. 54–60);
3. differences between variables due to the operationalisation of educational attainment, related to invalidity on the one hand and unreliability or measurement error on the other (e. g. wording of questionnaire items; level of detail of response categories; non-coverage of specific sectors of the educational system; type of information in education registers, see e. g. Groves, 2004, p. 50–53); and
4. differences in coding and harmonisation procedures that can be subsumed under processing error (see e. g. Groves, 2004, p. 53–54).

The first source of differences is the only 'legitimate' one. Inconsistency is thus conceptualised as observed instability of the data that is *not* due to 'actual' change. With the exception of unit- and item-non-response, the second issue will not be examined closely in this study because all data sources evaluated here are based on random sampling techniques, using relatively large samples and basically referring to the same population (residents in private households).[34] Different amounts of missing data across time-points, surveys and countries are another source of incomparability, as are differences in the (unknown) levels of attainment among respondents with missing values (item non-response) even if countries have comparable amounts of unit nonresponse. In this study, the main focus lies on the last two sources of inconsistencies, operationalisation and coding, i. e. those where improvements can be achieved by amending data collection instruments and coding procedures, and where the potential impact of inconsistent methodologies is large.

Chapters 4 and 5 thus aim at evaluating in how far consistency across time, surveys and countries is achieved, examining three large-scale cross-national surveys. Both input (data generation) and output (resulting distributions) will be covered. Coherence in the aggregate data *output* across time and data sources will be treated in Chapter 4. Educational attainment distributions using ISCED 97 will be compared over time and across three different surveys. This allows an evaluation of the 'reliability' of aggregate educational attainment data across time points and surveys. Coherence in the data collection *input* across countries will be discussed in Chapter 5 by examining possible causes of inconsistencies in distributions across time, surveys and countries. In order to achieve this, the data generation and harmonisation processes in

34 There are however differences across countries in the way 'residents' and 'households' are defined (see e. g. Hoffmeyer-Zlotnik and Warner, 2008). This issue will not be discussed in this study either.

the different surveys and countries will be closely investigated. This constitutes an evaluation of the 'equivalence of content validity' (see Section 3.4.2) across time points, surveys and countries.

4

CONSISTENCY OF EDUCATIONAL ATTAINMENT DATA IN THREE CROSS-NATIONAL SURVEYS

In the first section of this chapter (Section 4.1), the data sets used in this part of the study will be introduced. In the second and third section, the actual achievement of coherence across datasets will be evaluated by comparing the distributions of harmonised education variables 1. from different survey years for the same data source (Section 4.2) and 2. from different data sources for the same or close survey years (Section 4.3).

4.1 INTRODUCING THE EVALUATED DATA SOURCES: ESS, EU-LFS AND EU-SILC

Three European cross-national surveys will be examined in this and the next chapter: The European Union Labour Force Survey (EU-LFS), the European Union Survey on Income and Living Conditions (EU-SILC) and the European Social Survey (ESS). They were conducted around the same time, between 2002 and 2007, and all consist of at least three waves (however, specific countries are sometimes only covered in one or two waves). With respect to the coding of educational attainment, an ex-ante output harmonisation approach (Ehling, 2003) was chosen in all of them, which means that the survey organisers specified the cross-national education variable to be coded at the

outset, and it is the responsibility of the national teams or National Statistical Institutes (NSIs) to deliver data in this format. In all three surveys, the ISCED 97 was chosen as the coding frame, albeit in different levels of detail. The actual data collection processes, instruments and country-specific education variables (CSEVs) to be used can however differ substantially across countries and surveys.

4.1.1 *The European Social Survey*

The ESS (for the most recent technical report, see Jowell and the Central Co-ordinating Team, 2008) is a biennial repeated cross-sectional survey carried out in around thirty mostly European countries.[35] It covers the general population from age 15 upward. Its main focus is change in peoples' attitudes and values over time. The ESS also contains a number of variables capturing the social background of the respondents as well as their partners and parents, which in principle makes it attractive for comparative social stratification and mobility research. For this study, data from the first three rounds (collected in 2002/2003, 2004/2005 and 2006/2007 respectively) are analysed.[36] The data are processed, documented, distributed and archived by the Norwegian Social Science Data Services (NSD).

Exact sampling procedures in the ESS vary across countries, but they are co-ordinated and need to be 'signed off' by a specialist sampling panel, which e. g. insists on strict probability methods without substitutions or use of

35 These are Austria (AT), Belgium (BE), Bulgaria (BG), the Czech Republic (CZ), Cyprus (CY), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (GR), Hungary (HU), Iceland (IS), Ireland (IE), Israel (IL), Italy (IT), Latvia (LV), Luxembourg (LU), the Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), the Russian Federation (RU), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), Turkey (TR), Ukraine (UA) and the United Kingdom (UK). Not all countries participated in every round of the survey, and data for LV and RO were not yet released for the integrated data file because the design weights have not yet been produced.

36 The actual editions of the data used here are edition 6.1 for round one, edition 3.1 for round two and edition 3.2 for round three.

quotas. The procedures are documented in the ESS Documentation Reports, the Technical Reports and in the Final Activity Report (Jowell and the Central Co-ordinating Team, 2003, 2005, 2008).

Unit non-response is more of an issue in academic surveys than in official surveys because academic surveys are never compulsory. They also may be perceived as less important or legitimate by potential respondents. The response rates in the ESS are, despite all refusal conversion efforts, not always satisfactory and only PL achieves the target response rate of 70 % in all ESS rounds. CH and FR throughout have response rates of less than 50 %, and CZ, DE, IS, IT, LU, NL, TR and the UK also have response rates below 60 % in all rounds in which these countries participated. The ESS target on contact rates (maximum non-contact rate of 3 %) was reached in BG, CH, CY, FI, NL, NO, PL in all rounds in which these countries participated. In some countries, non-contact rates are exceptionally high in round two (CZ, SI and TR; $>$ 10 %), and for round three, exact non-contact rates are not (yet) documented for all countries. Table A.1 in the appendix shows an overview of response rates in all three ESS rounds.

Respondents were asked for their highest level of education using country-specific questionnaire items and response categories. The resulting CSEVs were reclassified into a simplified version of ISCED 97 by the national teams in the respective countries, and the data then sent to NSD. NSD provided the following pieces of information about ISCED 97 on a special web-site in order to support the national teams with the recoding work:

– For ESS round one, the UNESCO's operational manual (UNESCO, 1999) as well as a short description of the differences between ISCED 97 and the ESS coding frame was provided.

– For ESS round two, in addition to the UNESCO's operational manual, a two-page document (Norwegian Social Science Data Services, 2004) with some explanatory notes on how to process the CSEVs was provided, including the overview over ISCED 97 criteria given in UNESCO (1999), Table 2 (reproduced here in Table 2.1 on page 47).
– For ESS round three finally, also the ISCED mappings (Eurostat, 2005) linking national educational programmes to ISCED 97 categories were provided, and the explanatory notes were improved.

The explanatory notes (Norwegian Social Science Data Services, 2004, version provided for round three) contain the following guidelines for the measurement of educational attainment in the ESS:

> "Respondent's education (F6: EDULVL): Countries should use the best possible nationally designed instrument in F6 to measure respondent's highest level of education. This question corresponds to the country specific variable EDLVXX, where suffix XX refers to the country code. The data should then be re-coded into the ESS coding frame [...], resulting in variable EDULVL. National measurements must when necessary be adjusted to ensure complete coverage of relevant categories in EDULVL. All categories 0–6 should be covered in the national questionnaire. [...]
>
> For examples about how national bridging to ISCED 97 have been done in other surveys, it is recommended to download the "UOE coding example", giving valuable information about ISCED mapping in the UOE 2004 Education Survey. Many countries participating in ESS round three will in this cross national education study find examples of how national educations were coded into ISCED standard."

Therefore, it was stressed by NSD that CSEVs should be of high quality and detailed enough to allow coding into the main ISCED levels. However, rather than asking national teams to adopt the ISCED mappings, they were referred to as 'coding examples'.

The simplified ISCED variable *edulvl* in the ESS only distinguishes the main ISCED levels of education, but none of the sub-dimensions 'programme orientation', 'destination' or 'duration' (Norwegian Social Science Data Services, 2004):

0: Not completed primary (compulsory) education;
1: Primary or first stage of basic;
2: Lower secondary or second stage of basic;
3: Upper secondary;
4: Post secondary non-tertiary;
5: First stage of tertiary (not leading directly to an advanced research qualification);
6: Second stage of tertiary (leading to an advanced research qualification).

This enlisting of main ISCED levels already contains an error which will almost certainly lead to problems in the harmonisation process: The lowest category contains the word 'compulsory' as an explanatory attribute of 'primary' education.[37] The duration of compulsory education varies across countries and, if anything, coincides with ISCED level 2 rather than 1 (see Section 2.2.4.2). We shall come back to this when looking at the data collection instruments (Section 5.1) and harmonisation procedures (Section 5.2.3).

Missing data on the education variable (item non-response) are not problematic in the ESS apart from the case of IS. An overview is shown in Table 4.1.

4.1.2 *The European Union Survey on Income and Living Conditions*

The European Union Survey on Income and Living Conditions (EU-SILC) is the functional successor of the European Communities Household Panel (ECHP), a large-scale panel study of households in Europe, which ran from 1994 until 2001. EU-SILC is a yearly household survey conducted since 2003

37 This error is already present in Chapter 2 of the Questionnaire Development Report (Erikson and Jonsson, 2001, p. 28) and was implemented all through the pilot and the actual surveys.

TABLE 4.1: Missing data on the education variable in the ESS by round, %

	Round 1	Round 2	Round 3	Total
CH	1.4	0.0	0.1	0.5
DK	0.2	0.1	1.8	0.7
EE	.	1.9	4.4	3.0
ES	0.5	1.7	0.3	0.8
HU	2.6	0.0	0.3	1.0
IE	0.0	0.0	1.1	0.3
IS	.	14.3	.	14.3
LU	3.0	1.1	.	1.9
NO	1.6	0.2	0.2	0.7
RU	.	.	1.4	1.4
SK	.	3.5	3.3	3.4

Source: European Social Survey 2002–2007, own calculations. Respondents aged 25–64.
Note: In all countries not shown here, missing data are less than 1 % in all survey rounds.

(all EU member states covered since 2005) and serves the monitoring of incomes and living conditions in the EU. In contrast to ECHP, it is based on formal European Commission (EC) regulations (European Commission, 2003a,b,c,d,e, 2004, 2005b, see also Körner and Meyer, 2005). At the point of writing, data until 2006 are available from EUROSTAT.[38] EU-SILC allows cross-sectional as well as longitudinal analyses because it employs a rotating panel design, with each panel being substituted after four survey waves, i. e. four years in most countries (for more information, see Eurostat, 2008a,b,e).

In terms of response rates (unit non-response), the household response rate is only 30 % for NL and between 60 and 70 % in AT, BE, CZ, DE, HU and SI. In all other countries, it is above 70 %. As soon as a household agrees to participate, response rates of individuals within households are very high

38 The versions of the cross-sectional data sets used here are version 3 for 2004, version 4 for 2005 and version 1 for 2006. The anonymised EU-LFS and EU-SILC micro-data were provided by EUROSTAT via the Centre National de la Recherche Scientifique (contract number LFS/2006/10) for use in the Network of Excellence on Economic Change, Quality of Life and Social Cohesion (EQUALSOC) research teams 'Evaluation of the International Standard Classification of Education (ISCED 1997) for Comparative Research' and 'Evaluating the Potential of the EU-SILC 2005 Intergenerational Transmission of Poverty Module' of which the author is a member. The results and conclusions are the responsibility of the author of this study and not those of EUROSTAT, the EC or any of the national authorities whose data have been used.

(95 % or higher). Contact rates (successfully contacted addresses out of all eligible sampled addresses) are reasonably high, with the exception of DK and NL reaching only 90 % or a little less. There are furthermore complex differences between countries in sampling design and frames that could affect cross-national comparability (Eurostat, 2008a), but which, like for the ESS, cannot be discussed here.

In the EU-SILC, educational attainment is measured in a similar way as in the ESS, namely by ISCED 97 main levels. As measurement guidelines, the following information is given to the NSIs (Eurostat, 2008b):

> "Educational attainment of a person is the highest level of an educational programme the person has successfully completed and the study field of this programme. The educational classification to be used is the International Standard Classification of Education (ISCED 1997) coded according to the seven ISCED-97 categories. [...]
>
> The expression 'level successfully completed' must be associated with obtaining a certificate or a diploma, when there is a certification. In cases where there is no certification, successful completion must be associated with full attendance.
>
> When determining the highest level, both general and vocational education/training should be taken into consideration.
>
> Persons who have not completed their studies should be coded according to the highest level they have completed. Persons with no education (illiterate) should be coded -2.
>
> Value '5' corresponds to usual ISCED values 5 and 6."

Levels 5 and 6 are thus collapsed from the outset so that the data contain a six-level version of ISCED 97. One more difference compared to the ESS is that respondents without schooling are coded as missing on the educational attainment variable (*pe040*) and get a specific code (−2) on the attached 'flag' variable (*pe040_f*). For the comparison of distributions across time and surveys, these cases were recoded to ISCED level 0.[39]

39 This treatment of respondents without schooling actually seems to be a first cause of inconsistencies across time and countries in the EU-SILC: Some countries make use of this

TABLE 4.2: Missing data on the education variable in EU-SILC, %

	2004	2005	2006	Total
BE	1.7	3.7	1.6	2.3
DK	1.1	1.0	1.1	1.0
FI	1.1	1.2	1.2	1.2
IE	1.0	0.8	1.4	1.0
IS	1.6	1.4	1.6	1.6
NL	.	2.3	2.2	2.2
NO	0.2	2.5	4.2	2.2
PL	.	0.0	4.6	2.3
SE	0.7	0.8	1.1	0.9
the UK	.	8.4	8.6	8.5

Source: EU-SILC 2004–2006, own calculations. Respondents aged 25–64. Data not weighted.
Note: In all countries not shown here, missing data are less than 1 % in all survey waves.

Substantial amounts of missing data on the education variable (item non-response) are restricted to the UK (8.5 %, see Table 4.2). This is very similar in size to the large number of 'other and foreign qualifications' (including foreign degrees) occurring in the UK LFS, which are not post-coded (see Schneider, 2008a). These 'other qualifications' are potentially not random with respect to their (theoretical) ISCED assignment: They are probably rather low level qualifications, so that defining them as 'missing' might upgrade the educational attainment distribution for the UK compared to other countries.[40] They however also include foreign qualifications of various levels.

4.1.3 *The European Union Labour Force Survey*

Compared to the ESS and EU-SILC, the European Union Labour Force Survey (EU-LFS, Eurostat, 2006a, 2008c) is a rather old data source: First efforts to col-

specific missing value code for coding respondents without *qualifications* even if they have had schooling (especially FR), whereas others code respondents without qualifications who were in school in ISCED levels 0 or 1. In BE, NL and PT this changes over survey waves, leading to substantial changes in ISCED 0 over years—had the data not been recoded. Since the other surveys code individuals without education as ISCED level 0, this practice also introduces inconsistencies across data sources.

40 Office for National Statistics (2005) indicates a few example for qualifications to be coded as 'any other professional/vocational qualifications/foreign qualifications': 'Public Service Vehicle Licence' and 'First Aid qualification'.

late harmonised labour force statistics for the European Communities were undertaken in the 1960s. Unemployment is a prime policy concern, and the EU-LFS is the major source for monitoring employment and unemployment rates for the EU. Micro data are currently available from 1983 to 2005, with 'spring data' (quarter 1 or 2) up to 1997, and quarterly data increasingly available from 1998 onwards. Since 2005, all countries provide quarterly data to EUROSTAT.

The EU-LFS is a household survey consisting of up to (depending on the year) 31 national LFSs, including all EU member states and non-EU countries like CH, NO and IS.[41] The data are collected and harmonised by the NSIs according to common concepts and definitions, given in European Council regulations (Council of the European Union, 1998).[42] The data are then transmitted to EUROSTAT, where they are checked for errors. The EU-LFS implements a rotating panel design. Most countries have four panels and the oldest panel is replaced by a new one in each quarter.[43]

Unit non-response is less problematic in the EU-LFS than in the other two surveys. In fact, in quite a number of countries, participation in the national LFS is compulsory (AT, BE, CY, DE, ES, FR, GR, IT, NO, PT, SK, TR). The average response rate thus amounts to 82 % for 2005, with a range from 33 to 97 %. Response rates below 70 % are reported for DK (63 %), LU (33 %) and the UK (66 %, all from Eurostat 2007b). As with the ESS and EU-SILC, there are complex differences between countries in sampling design and frames (Eurostat, 2007b, p. 55).

41 Data for BG, Malta (MT), RO, CH and TR are not included in the data files distributed via EQUALSOC and documented in Eurostat (2006a).

42 Technical aspects as well as the contents of the survey are discussed and determined by the Employment Statistics Working Party, which consists of EUROSTAT and representatives of the respective national statistical offices and employment ministries.

43 Therefore, the same respondents are present in more than one quarter, and there should be a large overlap in survey statistics across quarters. Since the analyses reported here do not merge survey quarters, respondents will not be double-counted.

Since there is no dedicated European survey specifically targeted at measuring educational attainment and its conditions and outcomes, the EU-LFS is the de-facto source for education indicators (e. g. early school leavers, educational attainment of young people) in the EU. Thus the EU-LFS measures educational attainment in more detail than the two surveys discussed previously, which measure educational attainment only as a 'background variable'. The codification of ISCED was first introduced in the EU-LFS in 1998 and has changed in 2001, 2003 and 2006. Here, quarterly EU-LFS data from 2003 to 2005 will be used, for which there should be no changes in the education coding. Between 2003 and 2005, the EU-LFS distinguishes the following ISCED categories (European Commission, 2002; differences compared to other years are given in footnotes):

CODE 00: No formal education or below ISCED 1, denoted as '<1' in tables here;[44]
CODE 11: ISCED 1;
CODE 21: ISCED 2;
CODE 22: ISCED 3C (shorter than three years), denoted as 3Cs (for 3C short) in tables here;[45]
CODE 31: ISCED 3C (three years and more), denoted as '3Cl' (for 3C long) in tables here;[46]
CODE 32: ISCED 3 A, B;[47]
CODE 30: ISCED 3 (without distinction A, B or C possible, 3 years and more), denoted as '3' in tables here;
CODE 36: ISCED 3 or 4 (without distinction A, B or C possible);[48]
CODE 41: ISCED 4A, B;
CODE 42: ISCED 4C;
CODE 43: ISCED 4 (without distinction A, B or C possible);[49]
CODE 51: ISCED 5B;
CODE 52: ISCED 5A;

44 Between 1998 and 2001, this category did not exist.
45 From 2006 onwards, the three-year criterion was changed to two years (European Commission, 2005a).
46 Between 1998 and 2001, ISCED 3Cl and 4C were given in one category (European Commission, 1998).
47 Between 1998 and 2001, ISCED 3A and 4A were given in one category and ISCED 3B and 4B in another (European Commission, 1998). Between 2001 and 2003, 3A and 3B were differentiated (European Commission, 2000).
48 If in a country some distinction cannot be made at level 3 or 4, 'generic' level categories for ISCED 3, 4 and even '3 or 4') are available.
49 Between 2001 and 2003, ISCED level 4 was represented by one generic category only (European Commission, 2000).

CODE 60: ISCED 6;
CODE 99: Not applicable (child less than 15 years);
CODE BLANK: No answer.

The explanatory notes to the variable 'highest level of education or training successfully completed' in the EU-LFS user guide give the following measurement guideline for the NSIs (Eurostat, 2006a, p. 81):

- "Level is coded according to the International Standard Classification of Education 1997.
- Persons with no education (illiterate) should be coded 00.
- The expression 'level successfully completed' must be associated with obtaining a certificate or a diploma, when there is a certification. In cases where there is no certification, successful completion must be associated with full attendance.
- When determining the highest level, both general and vocational education/training should be taken into consideration.
- Persons who have not completed their studies should be coded according to the highest level they have completed and should not be coded with a blank.
- ISCED 3 without distinction possible should only be used in those cases in which a distinction A, B, C is impossible. This is typically the case for qualifications whose exact characteristics are not known either because they were obtained in another country or they refer to an education system no longer in existence."

These guidelines are relatively similar to the ones issued for the EU-SILC, which leads us to expect that both surveys produce rather similar results.

Item non-response is not an issue with these data: in the large majority of countries, less than 1 % of the cases have missing information on the education variable. Countries with non-negligible amounts of missing data are DE (up to 4.8 % before 2005; this changes to less than 1 % after DE's move to quarterly data in 2005), IS (up to 5.7 %), the UK (up to 4.5 %), IE (up to 2.8 %) and NL (up to 2.1 %).[50]

50 It will however be found in Section 5.2.2 in Chapter 5 that cases with 'other or foreign' qualifications (which are not post-coded) are classified as ISCED level 3 for the UK in the EU-LFS. They probably should rather be coded as missing, as they are in EU-SILC (see Section 4.1.2). Therefore, missing data is a serious problem in the case of the UK, which is however hidden in the harmonised ISCED variable distributed with the EU-LFS.

4.2 CONSISTENCY OVER TIME

The minimum demand on comparability across time is that different waves of one survey are coded in the same way, or at least in consistent ways so as to allow recoding of the more recent variable into the older variable (backward compatibility). Breaks in the series however can come about by changes 1. in the country-specific data collection instruments and 2. in the way country-specific qualifications are mapped to ISCED 97. The former can involve either changes in the question wording or changes in the response categories offered to the respondent, or both. If response categories are added, this either means that qualifications formerly not picked up by the instrument can then be identified, or that new educational programmes were introduced through educational reforms that did not exist before. Whereas the former might lead to visible breaks in the series, since newly introduced programmes only affect younger cohorts and take time to change the educational profile of a country as a whole, the latter should only lead to gradual changes.

Differences in the allocation of national education categories to ISCED 97 could mean two things: Misclassifications in some wave(s) of a survey in a specific country, which are not expected to show any regularity, or deliberate changes in the underlying coding scheme or harmonisation rules. The latter should be documented in the data user guide and will be evident from the fact that the same kind of change occurs in a number of countries at the same time. The final cause for changes in distributions—and the only change we would 'want' to find—are actual changes in the sample corresponding to changes in the educational attainment profile of the population. These changes however should be rather continuous and, if the data collection time periods of two surveys are not far apart, small.

4.2.1 *Consistency over ESS rounds*

Table B.1 in the appendix presents the distributions of the variable *edulvl* in the ESS. It highlights statistically significant changes over ESS rounds using an asterisk (*). In the ESS, many countries (AT, CH, DK, DE, FR, GR , HU, IT, NO, PL, PT, ES, SE and the UK) changed their data collection instruments and thus CSEVs in-between rounds, presumably in order to improve measurement quality or adapt the instrument to recent educational reforms. Changes in the way country-specific education categories are assigned to ISCED are also common. Therefore, the table also highlights 1. changes in the response categories in the country-specific data collection instruments, which could be derived from the questionnaires, showing a 'c' superscript in the 'round' column, and 2. changes in the assignment of country-specific response categories to ISCED categories, showing a superscripted dagger (†).[51]

NSD reports that for the first round, the Austrian educational attainment variable could not be harmonised into the common scheme because only one code for all post-secondary education was used (see Table D.1 on page 383). Therefore, harmonised education data for the first round are missing for AT despite AT participating in the survey. An extra response category was thus added in round two. Comparing the remaining two rounds, the response category classified as ISCED 6 in the second round is classified as ISCED 5 in the third round (Jowell and the Central Co-ordinating Team, 2008, ESS Documentation Report Edition 3.2, p. 10). In round two, the data seem to say that nearly 10 % of the adult population in AT are PhD holders, whereas there are no university or vocational tertiary education graduates without PhDs at all—which is obviously implausible. In fact, all university and polytechnic degrees were misclassified as ISCED level 6 in round two of the ESS (see

51 Misclassifications that do not change over time will be discussed in Section 5.2.3.

Table D.2, page 416). The improvement of the Austrian education variable in the second round (see Table D.1) thus did not go far enough yet, since there is still only one category for tertiary education, making the distinction between ISCED levels 5 and 6 impossible.[52] The other changes cannot be easily explained, but apart from the one in ISCED 4 they are insignificant when the data are not weighted.

In BE, something similar happened: In the third round, the large majority of cases in ISCED level 6 are shifted to ISCED level 5. A tiny proportion however stays in ISCED level 6, which is reasonable for a category reserved for PhDs. BE thus managed to implement the distinction between ISCED levels 5 and 6 correctly in round three (see Table D.2, page 417). There are however very large changes at the other ISCED levels, too: ISCED level 4 suddenly becomes populated with nearly a quarter of the cases. ISCED 2 and 3 each lose a significant and substantial amount of cases, and ISCED 1 more than doubles in size. This is due to a rather dramatic change in the way ISCED 97 was implemented in BE in the third ESS round "to improve comparability across countries" (Jowell and the Central Co-ordinating Team, 2008, ESS Documentation Report Edition 3.2, p. 11). However, whereas the re-classification of university qualifications below the PhD into level 5 is consistent with ISCED definitions, the other changes (reclassifying lower secondary vocational education to ISCED level 1 and technical and general upper secondary education to ISCED level 4) are not. In fact in BE three misclassifications are introduced in the third round of the ESS (again, see Table D.2). There are no significant differences between rounds one and two, and the response rate is also nearly constant across ESS rounds in BE.

52 Such problems with lacking differentiation of CSEVs are common and will be discussed separately in Section 5.1.3.

In CH, there are two major changes between rounds two and three: Firstly, a substantial amount of cases is swapped from ISCED level 4 to level 5. Secondly, level 1 is identified, which it was not in the previous rounds. Both are related to a wide-ranging change of the response categories in the country-specific questionnaire item in round three (see Table D.1, pages 385 to 387) and the correction of two misclassifications (see Table D.2, pages 418 to 421; also see the ESS Documentation Report Edition 3.2, Jowell and the Central Co-ordinating Team, 2008, p. 15): Two qualifications officially classified as ISCED 5B were coded at level 4 in the first two rounds of the survey. CH thereby eliminated all misclassifications from earlier ESS rounds *and* improved the CSEV with respect to the applicability of ISCED (see Section 5.1.3). Between rounds one and two, there are no statistically significant differences in the distribution of educational attainment despite an improvement of the response rate of 15 percentage points.

In CZ, which only participated in rounds one and three of the ESS, there were neither changes in the data collection instrument nor in the ISCED assignments. Consequently, the distribution of educational attainment does not change much. The decrease in the highest category is statistically significant though. A potential reason for the observed change could be the improvement of the survey response rate from 43 to 55 %.

For DE, we find some significant changes between rounds two and three: ISCED level 3 drops by 9 percentage points, and ISCED levels 4 and 5 grow by nearly 6 percentage points each. This must be due to changing ISCED assignments because the questionnaire items did not change apart from the distinction of Bachelor degrees in round three, which only identifies two cases though because these degrees were only very recently introduced in DE

(see Table D.1). The ESS Documentation Reports (Jowell and the Central Coordinating Team, 2005, 2008) however do not differ in the relevant section for rounds two and three so that the change in the CSEVs and ISCED assignments is in fact undocumented.

A detailed cross-tabulation of the two source variables (shown in Table D.1, page 389) and the cross-national variable *edulvl* reveals some changes in ISCED assignments over ESS rounds, documented in Table D.2, page 423. There seems to be some confusion around the ISCED assignment of *Anlernzeit*, which is an outdated vocational training period below the level of current apprenticeships. In ESS round one, it was regarded as upper secondary if following *Realschulabschluss* ('middle track lower secondary education'), *Abitur* or *Fachhochschulreife* ('full and restricted university entrance qualifications'), but not *Volks-/Hauptschulabschluss* ('lower track lower secondary education'). In round two, it was not taken into account at all, so that respondents were classified according to their highest level of general education. In round three in turn, it was classified in the same way as nowadays' apprenticeships (level 3 if following a lower secondary qualification, and level 4 if following an upper secondary qualification). None of these solutions is really satisfactory. *Anlernzeit* should be regarded as a short 3C qualification and thus be assigned to ISCED level 2 in the levels-only version of ISCED, unless following a general upper secondary qualification, when it should probably just not be taken into account since these are very few cases with a very unusual educational career (see also Schneider, 2008b).

Furthermore, *Berufsfachschulabschluss* ('school-based vocational education', nationally regarded as equivalent to apprenticeships) and *Berufsgrundschuljahr* ('one-year vocational schooling') were classified as level 3 if combined with lower secondary qualifications and level 4 if combined with upper

secondary general qualification in rounds one and two of the ESS, like apprenticeships and in accordance with the ISCED mappings.[53] In round three however, these qualifications are assigned to level 5, which is clearly inappropriate. *Fachschulabschluss* is classified as level 3 in rounds one and two and level 5 in round three. Here, the later assignment conforms with the ISCED mappings, but not the earlier one. The increase of level 5 in Table B.1 can be explained by these two changes, one of which is 'right', and the other of which is 'wrong'. Finally, respondents who completed *Zwischenprüfung* or *Vordiplom* ('intermediate examinations after two years of university study') after an upper secondary general qualification were assigned to ISCED level 3 in ESS rounds one and two, but level 4 in ESS round three. The harmonisation of German qualifications into ISCED 97 is thus highly inconsistent over ESS rounds.

The Danish team slightly changed the response categories for their education variable in the second ESS round: one marginal category was omitted, and the questionnaire wording for the higher education responses was changed in such a way that three-year qualifications are explicitly included in the middle category and the higher category is distinguished by programme duration rather than institution or certificate (see Table D.1, pages 391 and 392). Also example qualifications are mentioned. This leads to a rather large increase at ISCED level 5 and a similarly large decrease at level 3. The new wording of the higher education categories seems to pick up a wider range of qualifications than the old wording. The bridging of the CSEV to ISCED was not changed over rounds (see Table D.2, page 429).

53 It however could be argued that *Berufsgrundschuljahr* should not be classified in the same way as *Berufsfachschulabschluss* or 'apprenticeships' since they in fact only cover the school-based but not the practical component of upper secondary vocational education and therefore do not give access to ISCED 5B. Although it is regarded as ISCED 3B by the German Statistical Office, it should rather be classified as ISCED 3Cs.

In EE, it looks like cases swap from ISCED level 5 to levels 4 and 6 in the third ESS round (EE did not yet participate in the ESS in the first round). Indeed the mapping of the CSEV to ISCED was changed in round three (see Table D.2, pages 430 and 431, see also Jowell and the Central Co-ordinating Team, 2008, ESS Documentation Report Edition 3.2, p. 12): the assignment of the country-specific category *Keskeri/tehnikumiharidus pärast keskharidust* ('professional or technical school after secondary education') was changed from ISCED level 5 to level 4 in ESS round three. This qualification is however classified as 5B in the ISCED mappings. Therefore, rather than correcting an earlier misclassification, EE introduced a discrepancy from the ISCED mappings in round three (like BE).

With respect to ES, the lowest category is significantly larger in the second round than in both the first or the third. Although the changes in the questionnaire affect the lower education categories (see Table D.1, pages 395 and 396), it is hard to see why this should lead to the changes observed in the data. ES added three and changed two categories at the primary/lower secondary level, in order to better accommodate for changes in primary and lower secondary education in the Spanish educational system over the last 30 years. With so many response categories for only primary education, the Spanish questionnaire item looks quite difficult to navigate though, and there is wide variation in the number of *years of education* in these lower categories. There might thus be a substantial amount of measurement error in the Spanish educational attainment variable in ESS round two.

The first and second cycle of vocational education, *Formación Profesional de primer grado (FP 1)* and *Formación Profesional de segundo grado (FP 2)*, are both downgraded by one ISCED level in round two (see Table D.2, pages 432 and 433). In the first round, both were classified according to their official ISCED

assignments; in the second round, this was changed since most people in the sample have actually completed these qualifications at a time when they were still clearly consistent with the criteria for the lower ISCED levels used from round two onwards (Ortiz, 2008). Since the questionnaire item and ISCED assignment did not change for the higher categories, the changes at ISCED level 5 are again hard to explain. In the third round, level 3 increases significantly, which also cannot be explained by either changing instrument nor ISCED assignments. The increase in the response rate of 11 percentage points between rounds two and three of the ESS might play a role here.

In FI, although there are some significant differences across survey rounds, these are largely monotonic and in the expected direction, assuming educational expansion. The only exception is the growth of the very lowest category in the last ESS round. The reason is a change in the label of the lowest response category of the questionnaire item (see Table D.1, page 397 and the ESS Documentation Report Edition 3.2, Jowell and the Central Coordinating Team, 2008, p. 12). The decrease in the response rate for FI by 6 percentage points in ESS round three could play a role here, too. The ISCED assignments remained the same over rounds (see Table D.2, page 434).

FR is again a case where there are obviously too many cases classified as ISCED level 6, which will be further examined in Chapter 5, Sections 5.1.3 and 5.2.3. In terms of changes over ESS rounds, there is only one discontinuity, with level 3 being significantly larger in round two than in rounds one and three. The change in the questionnaire item (see Table D.1, pages 398 and 399) is a minor one—the highest category is split in two, which should not affect the distribution at all, given the ISCED assignments stay the same (see Table D.2, page 435).

The case is similar in GR, where the only change in the questionnaire is the distinction of PhDs from other university degrees in the second round (see Table D.1, page 400). There are, however, also significant changes in the distribution for GR, with the lowest category shrinking significantly and level 4 growing, despite identical ISCED assignments across ESS rounds (see Table D.2, page 436). The response rate is relatively high ($> 75\%$) and stable for GR, but still non-response and sampling error are the most probable sources of these inconsistencies.

HU is a rather complicated case, since the questionnaire item changed in round two (see Table D.1, pages 401 and 401) and the assignment of national qualifications to ISCED categories changed in round three (see Table D.2, page 437 and Jowell and the Central Co-ordinating Team, 2008, ESS Documentation Report Edition 3.2, p. 13). Moreover, there seems to be a problem with the weights supplied—for round one, all weights equal 1, and for round two, the results of the weighted data very much differ from the unweighted data and introduce more change over ESS rounds than without weighting. Therefore, Table 4.3 reproduces the respective part of Table B.1 without weights applied. The decrease of ISCED level 0 between rounds two and three can be explained by the changing assignment of those who finished 4 or 7 years of basic education to level 1. ISCED level 2 decreases because respondents with incomplete secondary education are re-classified from level 2 to level 1 in the second round of the ESS. In the third round they are however back in level 2, where they belong since one can assume that respondents who dropped out of upper secondary education have completed at least lower secondary education. The slight but non-significant increase of ISCED level 3 in round two is probably due to the introduction of a new response category in round two, technical secondary education with matura

TABLE 4.3: Distribution of educational attainment in the first three ESS rounds 2002–2007 in HU, variable *edulvl* in %

Country	Round	ESS ISCED 97 categories							N
		< 1	1	2	3	4	5	6	
HU	1	3.6	20.5	33.7	25.7	.	9.2	7.4	1099
HU	2[c]	2.3	20.8	27.9*†	28.3†	2.5†	17.6*†	0.6*†	1033
HU	3	0.1*†	22.9†	33.2*†	27.4†	1.6†	13.5	1.4	961

Source: European Social Survey 2002–2007, own calculations. Respondents aged 25–64.
Notes:
[c] = CSEV changed in this round;
† = Composition of ISCED category with respect to country-specific categories contributing to it changed in this round. If the CSEV changed, affected ISCED categories are marked;
∗ = Statistically significant ($p \leqslant 0.05$) change in category size compared to the previous ESS round

(érettségire épülő felsőfokra nem akkreditált szakképzés, középfokú technikum). ISCED level 6 decreases in round two because first university degrees (egyetemi diploma) are re-classified to ISCED level 5, where they belong.

With respect to IE, the measure does not change over rounds (see Table D.1, page 402) and the ISCED assignments are maintained, too (see Table D.2, page 438). Still, there are some significant and substantial differences across rounds, with ISCED level 6 being surprisingly big (5.2 to 12.5 %) at the same time. ISCED level 3 is around 5 % larger in round two than in rounds one and three. ISCED 1 decreases considerably in round three, whereas ISCED 4 and 6 increase.

IT (which did not participate in ESS round three) added a category for post-secondary non-tertiary education to their CSEV and changed the content of a couple of higher education categories in ESS round two in order to reflect the introduction of the 'Bologna' structures (see Table D.1, page 403 and Barone and Schizzerotto, 2008). Therefore, in round two, IT distinguishes *Laurea triennale* (three-year university degree, BA level) and *Laurea specialistica* (second university degree after further two years of study, MA level). It is

however unclear where respondents with the 'old' *Laurea*, which took formally four to six years to complete, would classify themselves using the new instrument. What we can see in the data is that ISCED level 1 decreases substantially, and level 5 nearly doubles, partly also because *diploma universitario* is re-classified from ISCED level 4 to 5 (see Table D.2, page 439). The response rate for IT increases by 16 percentage points, which might also contribute to the instability of the educational attainment distribution.

For LU, ISCED <1, 2 and 4 increase significantly in round two. This change is insignificant for level 2 if the data are not weighted. Since neither CSEV nor ISCED assignments change (see Table D.1, page 404 and Table D.2, page 440), the origin of these differences remains obscure. Again, the change in response rates (up 7 percentage points) might play a role.

With respect to NL, we find that ISCED level 2 decreases significantly in round three; otherwise the distributions are relatively stable. Since neither response categories nor ISCED assignments have changed (see Table D.1, page 405 and Table D.2, page 441), there are no obvious explanations for the observed changes. The response rate however decreases across ESS rounds, with a difference of 8 percentage points between rounds one and three.

NO changed the data collection in round two from register data to survey data, without changing the country-specific categories though (see Table D.1, page 406).[54] This leads to significant and substantial increases of ISCED levels 2, 4 and 6 and significant and substantial decreases of ISCED level 3. Therefore, there are substantial discrepancies between the educational qualifications recorded in the Norwegian education register and individuals' reports on the qualifications they hold. Antelius and Björklund (2000, p. 344)

54 In ESS round one, the Norwegian respondents were linked up with the national education register, an administrative data source, so that they did not have to report on their educational attainment themselves. The use of register data will be further discussed in Section 5.1.1.

give three reasons for such discrepancies with reference to Swedish (register and survey) data: One reason could be that respondents report 'nearly completed' studies as successfully completed, whereas register data is more strict. Another source could be missing reports on awarded qualifications by the educational institutions to Statistics Norway; for SE, this seems to be the case for qualifications attained in private education institutions (Breen and Jonsson, 2000), of which there are only few though. Finally, respondents could simply give a wrong answer.

Although there is no further change to the data collection instrument in round three, we see level 5 growing considerably and level 6 shrinking by approximately the same amount—the reason is that university degrees below the PhD were misclassified as level 6 until round three, which was subsequently corrected (see Table D.2, page 442 and Jowell and the Central Co-ordinating Team, 2008, ESS Documentation Report Edition 3.2, p. 13), as we have seen in a number of countries before. The response rates for NO are rather stable across ESS rounds.

PL, PT and SI reveal remarkably stable educational attainment distributions across rounds with no statistically significant changes over rounds. SI neither changed the ISCED mapping (see Table D.2, page 447) nor the data collection instrument (see Table D.1, page 412). The mappings for PL did not change either (see Table D.2, page 443). The changes in the data collection instruments were not consequential: PL suppressed two categories for incomplete studies at the secondary and tertiary levels (see Table D.1, page 407 and Section 5.1.2.2), which might explain why ISCED 5 shrinks a little and ISCED 3 increases slightly.

PT increased the amount of differentiation at post-secondary education levels (see Table D.1, page 408) in ESS round three. This however does not have any

consequences for the harmonised education variable because the ISCED assignments remain the same. The correction of one misclassification (ISCED 3 to ISCED 5) concerning *superior politécnico* in round two (see Table D.2, page 444) leads to a slight increase of level 5. In the first round, some respondents with *Mestrado/Doutoramento* were assigned to level 5 (it is unclear on which basis this distinction was made), which is why level 6 is slightly smaller in that round. In round three, a few (1 to 14) cases in five country-specific education categories are assigned to the next lower ISCED category (0 rather than 1, 1 rather than 2, 3 rather than 5). Again, it is unclear why exactly these individuals were coded differently, since it is not documented in the ESS Documentation Report (Jowell and the Central Co-ordinating Team, 2008).

For SE, we see a break between rounds two and three. At levels 5 and 6 this can be explained with the change of the response categories in the questionnaire, where a separate category for PhD degrees (*Forskarutbildning*) was added (see Table D.1, pages 410 and 411), whereby the misclassification of other university degrees after at least three years of study as ISCED level 6 could be corrected (see Table D.2, page 446 and Jowell and the Central Co-ordinating Team, 2008, ESS Documentation Report Edition 3.2, p. 15). The increase of level 3 and decrease of levels 1 and 2 can be explained by changing ISCED assignments, which corrected a number of (but not all) misclassifications: *Grundskola/Enhetsskola* (elementary school of 9 years duration) was re-classified from ISCED 1 to ISCED 2 and *2-årig gymnasielinje* (two-year high school) was re-classified from ISCED 2 to ISCED 3.

SK is again a country with a high degree of stability, despite an increase in the response rate of 10 percentage points. The only change is a re-classification of respondents with incomplete basic education (*neukončená základná škola*)

from ISCED level 0 to ISCED level 1 (see Table D.2, page 447 and Jowell and the Central Co-ordinating Team, 2008, ESS Documentation Report Edition 3.2, p. 14–15). This will be further discussed in Sections 5.1.3.1 on page 168 and 5.2.3.1 on page 200.

In UA (which did not yet participate in ESS round one) there were neither re-classifications of categories nor changes in the instrument (see Table D.1, page 413 and Table D.2, page 449). The response rate is also remarkably stable. We thus observe relatively consistent educational attainment distributions across ESS rounds; the only significant changes over rounds are insignificant with unweighted data.

With respect to the UK, harmonised educational attainment data were only published for rounds one and three (see Table D.2, page 450). In the second round, the data collection instrument did not cover TVET, which can be regarded as an example of construct underrepresentation, and thus could not be harmonised into ISCED (see Table D.1, page 414 and Section 5.1.4). The instrument is the same in both rounds, as are the ISCED assignments. We observe rather large differences in ISCED levels 2 (down 7 %) and 5 (up 9 %), which plausibly suggest educational expansion, maybe combined with credential inflation (i. e. it became easier over time to achieve a level 5 qualification). However, the difference is rather too large for a time difference of only four years. Although the response rates are relatively stable over ESS rounds, they are rather low (< 60 %) so that non-response error could be a source of the inconsistencies over ESS rounds.

To summarise, there are large differences in the distribution of educational attainment over ESS rounds in a non-negligible number of countries. As a summary, Table 4.4 reports Duncan's dissimilarity index (Duncan and

TABLE 4.4: Duncan's Dissimilarity Index for educational attainment distributions across ESS rounds, variable *edulvl*

	ESS rounds 1–2	ESS rounds 2–3
AT	.	14.9
BE	2.6	54.4
CH	3.2	14.7
CZ	2.9	.
DE	2.1	11.5
DK	13.8	5.2
EE	.	14.3
ES	13.4	10.7
FI	6.2	2.7
FR	3.4	7.0
GR	4.8	.
HU	24.1	17.3
IE	8.4	13.2
IT	8.1	.
LU	7.0	.
NL	4.9	5.8
NO	22.7	21.0
PL	4.7	3.3
PT	4.5	2.9
SE	3.9	38.9
SI	5.0	4.8
SK	.	3.0
UA	.	5.9
UK*	9.7	.
average	7.8	13.2
min	2.1	2.7
max	24.1	54.4

Source: ESS 2002–2007, own calculations. Respondents aged 25–64. Weighted using the design weight (*dweight*).
Note: * = For UK, data for round two could not be harmonised. Therefore, ESS round one and ESS round three are compared.

Duncan, 1955, p. 211) for all countries, comparing the distributions of educational attainment in ESS round one with the respective distribution in round two (first column) and then the distribution in ESS round two with that in round three (second column).

The index of dissimilarity ranges from 0 to 1 (it was here rescaled to range from 0 to 100) and can be interpreted as the percentage of cases that would have to swap categories in order to achieve equal distributions across the two survey rounds compared. Formally, if x_i denotes the size of category

i out of k ISCED categories in ESS round one in per cent and y_i denotes the same for ESS round two, the dissimilarity index is defined as

$$D = 1/2 \sum_{i=1}^{k} |x_i - y_i| \tag{4.1}$$

Thus the absolute differences across survey rounds in each ISCED category are summed up over all categories and the resulting value is divided by 2. The index of dissimilarity was originally developed for measuring residential segregation. It can however be generalised to a measure of differences in distributions on categorical variables.[55]

We firstly find that ESS rounds one and two are more similar than rounds two and three. The largest index value for the first comparison we find for HU and NO with a dissimilarity index of more than 20 %. For the second comparison, we find the highest value overall in the case of BE with 54 %, which suggests extraordinarily large changes across ESS rounds. Between rounds two and three, around half of the countries show values of more than 10 % on the index of dissimilarity, and only in PL, PT and SI the index value is equal to or below 5 % in both comparisons.

In most cases, the observed changes across ESS rounds can be explained by either changes in the data collection instrument or changes in the way national education categories are mapped to ISCED categories. This could be diagnosed in quite some detail because of the availability of the country questionnaires, the technical reports (Jowell and the Central Co-ordinating Team, 2003, 2005, 2008) and the CSEVs distributed by NSD. Since data from the earlier rounds are not adapted to the way the ISCED assignments are

55 Alternatively, the Index of Net Difference ND (Lieberson, 1976) could have been used. However, since the ISCED version employed in the EU-LFS is not ordinal and ND requires ordinal data, D was chosen for all data sets.

changed in later rounds, the three ESS rounds are not comparable. Nevertheless, NSD provides a cumulative ESS data file. In order to reach comparability, the ISCED assignments should be made as consistent as possible over survey rounds, especially for the cumulative data file. Remaining and smaller differences will probably be due to differences in sampling and non-response error across survey rounds.

Finally, the number of re-classifications that could be diagnosed, often correcting misclassifications in earlier ESS rounds (see e. g. the large shifts from category 6 to category 5 over rounds), are alarming. Therefore, the consistency of ISCED assignments across countries will be investigated in some more detail and in a more analytical fashion in Section 5.2.3.

The ESS is an academically driven survey, the producers of which do not necessarily have much familiarity with official education statistics, the ISCED classification and its application to survey data and country-specific educational qualifications. The ISCED mappings were e. g. only made available to national teams in the ESS from round three onwards, and national teams were not asked to adopt them. Also the samples are rather small, and there is some degree of uncertainty if observed changes are 'real', even after testing for statistical significance. In the end, when performing a lot of significance tests, one is bound to find some 'significant' ones by chance.

Are data issued by official bodies that produce their own guidelines for internal use and co-ordination more consistent across time? In the next two sections, the consistency of education codings in the two large scale surveys co-ordinated and published by EUROSTAT, namely EU-SILC and EU-LFS, will be examined.

4.2.2 *Consistency over waves of the EU-SILC*

Table B.2 shows the distributions of educational attainment in EU-SILC across countries and survey waves. Some countries did not yet conduct the survey in 2004. Given the large sample sizes, almost all changes across survey waves are statistically significant. Therefore, when interpreting the table, I will focus on 1. non-monotonic changes (which can only be evaluated for countries that have data for all three years) and 2. substantial changes in terms of the size of the change. Since information on response rates is not available for all survey waves, non-response cannot be taken into account.

In AT, there are two discontinuities in 2005—ISCED 1 shrinks considerably from 2004 to 2005 (and slightly increases again in 2006), and ISCED 5/6 grows substantially (and slightly decreases again in 2006). The change in the lower categories can possibly be explained by changes in the response categories of the Austrian EU-SILC questionnaire: one response category was changed from 'compulsory school and apprenticeship' (*Pflichtschule mit Lehrabschluss*) to 'apprenticeship' (*Lehrabschluss*) only. There might be a substantial proportion of people in AT who completed an apprenticeship without having first finished compulsory school that were consequently classified as ISCED level 1 (corresponding to 'no compulsory schooling certificate', *kein Pflichtschulabschluss*) in 2004 but ISCED level 3 in 2005 and 2006.

For BE, CY and CZ, the distributions look rather stable. CZ however distinguishes between ISCED levels 0 and 1 only in 2006. For DE, we find an extraordinarily large decrease in the highest category, from 39 to 23.3 %, and (relatively) large increases at ISCED levels 2 (from 7.7 to 12.6 %) and 3 (from 43.4 to 52 %). There is a small change in the German response categories,

where one category entering ISCED level 5 is more inclusive in 2005 (*Fachhochschule, auch Ingenieurschule*, which means 'polytechnic university, including engineering schools') than in 2006 (where 'engineering schools' are not specifically mentioned any more). However, this change cannot explain a difference of 15 percentage points across survey waves. In this case, it is almost certain that ISCED was constructed differently in the two waves observed.

With respect to DK, the observed and rather small changes do not contradict common expectations of increasing levels of attainment over time. There are equally no major anomalies for EE; only minor fluctuations. As regards ES, the coding of ISCED must have changed in 2005 since ISCED 1 and 2 change substantially: ISCED 1 grows from 19.3 to 26.6 %, and ISCED 2 decreases from 29.4 to 21.2 %. In 2006, these categories move a little closer to the distribution of 2004 again. Since the questionnaires collect verbatim information on respondents' educational attainment that is then post-coded, differences in response categories cannot be the reason. However, if the post-coding of the verbatim information on educational attainment is not highly standardised, this is a source of unreliability that was not considered so far since this method of collecting data on educational attainment is rare.

For FI and FR, one can observe rather stable or monotonically changing education distributions in the expected direction: the lower categories decrease in size, and the higher categories expand. There are however large differences between the countries in what 'lower' means: In FR, up to a quarter of the population has not finished lower secondary education with a formal qualification, whereas FI does not even cover the two lowest ISCED categories.

In GR, there is a little undirected fluctuation. In the case of HU, ISCED 2 shrinks from 22 to 17.1 %, and ISCED 4 grows from 0.6 to 3.2 %. With regards

to IE, change looks very monotonic, with ISCED 1 to 3 shrinking and ISCED 4 and 5/6 growing over the years. Pretty much the same, but at different levels, can be observed for IS, and the picture is similar in IT, Lithuania (LT) and LU.

For LV, there is a very consequential change in the ISCED coding across years: ISCED 1 changes from 12.4 to 0.8 %, and ISCED 2 from 4.1 to 14 %. The reason is probably that the response categories in the Latvian questionnaire became more detailed in 2006: Basic education (*Pamatizglītība*) is split into two stages, so that respondents can indicate if they have completed the first four years only or all nine years. The latter is classified as ISCED level 2 in 2006, whereas in 2005, all basic education was classified as ISCED 1. This is not in accordance with ISCED criteria, but is likely to happen in countries with basic school running from grade 1 to 9 or 10 since in these countries, this is usually what people understand when talking about 'primary education' (see also Section 5.2.3). Although the definition of ISCED level 1 is rather clear, the different national and international terminologies when it comes to 'primary education' do pose a problem.

In NL, the distributions are very stable. With respect to NO, we again find firstly a decrease in ISCED 0 from 2.7 to 0.2 in 2005. Table 4.2 showed an increase by a similar amount in missing values for NO in the same year, which might be related to the shrinking ISCED 0 category. Secondly a major change in the 2006 data compared to both earlier years can be observed: ISCED 2 increases from around 10 to 21.4 %, and ISCED 3 decreases from around 54 to 42.5 %. This can be explained by a change in the way ISCED is applied in NO which Statistics NO implemented in 2006 (Jørgensen and Nygård, 2006): People who have only completed one year of upper secondary education between 1974 and 1994 are classified as level 2 rather than level 3 from 2006

onwards. The result is a better match of the data for NO with the ISCED definitions and thus increased cross-national comparability in the 2006 wave of the EU-SILC. Since these changes are applied in the Norwegian education register, the updated data could theoretically be retrieved for the 2004 and 2005 EU-SILC waves.

The distribution looks rather stable again for PL, PT and SE. PT increased the level of detail in their questionnaire item which allows the identification of ISCED level 4 (as well as further distinctions within levels 3 and 5, not implemented in the EU-SILC). PL does not use ISCED level 2, which is exceptional. Probably this is again due to the confusion between 'primary education' in the sense of ISCED (level 1) and 'primary education' in the national sense, which is internationally 'basic education' and ISCED level 2.

For SI, we again find major discontinuities: ISCED 1 and 2 seem to 'swap' cases so that ISCED 1 decreases and 2 increases considerably. There must have been a change in the way Slovenian qualifications are mapped to ISCED categories, but in contrast to the ESS, for the EU-SILC, such changes are not documented. Since the pattern is similar to the change in LV, the reason might be similar, too: mistaking ISCED 'primary education' for Slovenian 'basic education', *osnovna šola*. SK looks fine, but for the UK we find some noticeable differences across waves again: ISCED level 2 grows from 19.6 to 23.5 %, whereas ISCED 3 and 4 shrink by around 2 % each.

To summarise, Table 4.5 reports Duncan's dissimilarity index for the two comparisons of EU-SILC waves. Non-negligible changes across EU-SILC survey waves can be diagnosed for AT, DE, ES, HU, LV, NO, and SI where the index of dissimilarity exceeds 5 %. These changes are probably too large to be explained by actual change. They must therefore be due to either changes in

TABLE 4.5: Duncan's Dissimilarity Index for educational attainment distributions across EU-SILC waves

	EU-SILC 2004–2005	EU-SILC 2005–2006
AT	8.0	1.4
BE	2.5	2.2
CY	.	1.0
CZ	.	1.2
DE	.	15.7
DK	1.3	0.8
EE	2.0	1.3
ES	8.9	3.1
FI	1.2	1.5
FR	1.3	1.1
GR	1.5	0.9
HU	.	5.5
IE	1.5	1.7
IS	3.1	2.1
IT	3.0	1.8
LT	.	1.4
LU	1.7	0.9
LV	.	12.9
NL	.	0.6
NO	3.0	12.4
PL	.	1.3
PT	2.1	1.0
SE	1.5	1.3
SI	.	8.7
SK	.	1.4
UK	.	4.0
mean	2.8	3.4
min	1.2	0.6
max	8.9	15.7

Source: EU-SILC 2004–2006, cross-sectional files from Eurostat. Respondents aged 25–64. Weighted using the cross-sectional weighting factor (*pb040*).

the data collection instruments and/or changes in the assignment of educational qualifications to ISCED categories. For AT, LV and (partly) DE, changes in the questionnaires might be responsible for the change in distributions. In LV, the questionnaire was probably changed in order to allow a better application of ISCED. In the case of NO, a revision of the ISCED assignments to national qualifications is responsible for the observed discontinuity. With regards to ES, the reason could be a low level of inter-coder reliability, since data are not collected with fixed response categories but with open ques-

tions. Overall, the observed differences across waves are however much smaller than the ones observed for the ESS in Section 4.2.1. Partly this will be due to the larger sample sizes and higher response rates in EU-SILC, thus leading to a lower levels of sampling variability and non-response error. A more consistent application of ISCED is also likely.

4.2.3 *Consistency over time in the EU-LFS*

Since the EU-LFS is a longstanding data source, there are two different types of inconsistencies over time: 1. changes in the codification of the education variable controlled by an EC regulation (see Section 4.1.3 and European Commission, 1998, 2000, 2002) and 2. inconsistencies in the coding of educational attainment that are not implied by an EC regulation and are thus undocumented. The former, 'regular' changes over time are briefly summarised in the next section without comparing actual data for the different years. The latter, irregular changes can only be derived from the actual data, which will be examined in Section 4.2.3.2.

4.2.3.1 *Changing codification of the educational attainment variable*

From 1998 to 2001, ISCED levels 3 and 4 were not distinguished, but the sub-dimension *programme destination* was fully implemented (3A/4A, 3B/4B, 3C/4C). Since 2001, ISCED levels 3 and 4 were distinguished. From 2001 to 2003, ISCED level 3 was differentiated into 3A, 3B and 3C, but since 2003, 3A and 3B are collapsed in one category (3AB). With respect to ISCED level 4, between 2001 and 2003, 4A, 4B and 4C were not distinguished, but since 2003, 4A and 4B (4AB) are differentiated from 4C.

Therefore, the ISCED variable in the EU-LFS is not consistent over years *by design*, and there is no way of getting from one to the other coding unless collapsing ISCED levels 3 and 4 altogether. If the main levels and sub-categories A, B and C had been fully implemented in all years, such a problem would not have occurred. It is unclear why sub-categories are merged in different ways for different years, as a rather high price is paid for the slight saving on numbers of categories.

As will be shown in Chapter 7, the level of aggregation of educational qualifications is not only a problem for comparisons over time, but also for the relevance of the resulting statistics. The difference between qualifications providing access to very different types of tertiary education (3A leading to 5A and 3B leading to 5B) is ignored since 2001, although such programmes are very different in terms of their functions for the labour market and in terms of their educational content.[56] The distinctions drawn in the EU-LFS also do not allow separating out vocational and general education at the upper secondary and post-secondary non-tertiary levels, since programme destination was chosen as the differentiating criterion rather than programme orientation. However, in contrast to the ESS and EU-SILC, EU-LFS at least draws some distinctions within ISCED levels.

4.2.3.2 *Consistency over survey quarters*

Table B.3 in the appendix shows the distribution of the relatively detailed ISCED categories for all countries by year and quarter. With data as detailed as in the EU-LFS, a combination of two methods is employed to ensure that most breaks in the series are identified: 1. checking for coding changes across survey quarters by identifying structural breaks in Table B.3, i. e. identifying

56 For DE for example, this means that vocational training (3B) cannot be differentiated from university preparatory general education (3A).

categories that are used in some quarters but not in others, and 2. checking for large changes across survey quarters using Duncan's dissimilarity index. Coding changes that neither involve changing use of categories (structural breaks) nor shifts across categories for a visible proportion of the sample cannot be identified. These can only be diagnosed through a direct comparison of country-specific educational attainment variables and the comparable ISCED variable, which is not possible for the EU-LFS because like in EU-SILC, the CSEVs are not delivered to EUROSTAT.

In AT, we see a number of changes in the first quarter of 2004, leading to a higher degree of differentiation and some upward shift of the distribution as a whole. This is due to changes in the data collection instrument in connection with the implementation of the continuous labour force survey in AT in 2004 (European Commission, 2006, p. 23). ISCED 3Cs becomes differentiated, and it seems that around 3.5 % of cases were formerly falsely classified as ISCED 3AB, since category 2 does not change in size, but category 3AB shrinks statistically significantly and substantially. The generic category for ISCED level 4 is abandoned, and cases classified there in 2003 are classified as ISCED 4AB in 2004 and 2005, which is more specific. However, ISCED 4C remains empty, which is a bit suspicious since AT has qualifications classified as 4C in the ISCED mappings. Lastly, ISCED 6 becomes identified—respondents with doctorates must have been misclassified as 5A before.

In BE, there is a break in the first quarter of 2005, introducing the distinction between respondents with primary education (ISCED 1) and respondents with less than primary education (ISCED <1). There are no discontinuities in CY. In CZ, ISCED 3Cs and the generic ISCED 3 increase statistically significantly in the second quarter of 2003 compared to the first quarter. Both these categories are not used any more from the third quarter of 2004 onwards.

Cases previously in those categories are re-classified in category ISCED 3Cl, which thereby grows significantly. In DE, there is no clear break, but there are some discontinuities that are statistically significant. ISCED 1 increases and ISCED 6 decreases significantly in 2005, when quarterly data become available for DE (which included a few changes in the questionnaire and a change in the weighting scheme, Eurostat, 2007d, p. 21). ISCED 2 is significantly smaller in the first quarter of 2005 than before and after and thus forms an outlier quarter. ISCED 3AB decreases significantly in the second quarter of 2005.

In DK, there is a minor break in the first quarter or 2004, which is however not obvious from Table B.3 since there are too few cases involved to show up in the distributions that show one decimal place only: there are 1 to 7 cases in the generic category ISCED 3 in 2003, and no cases afterwards. It is not possible to tell where these cases went afterwards, but given the numbers this is negligible. In EE, similar to CZ, cases in ISCED 3Cs are re-classified into ISCED 3Cl in the third quarter of 2004, significantly increasing the size of the latter category. In ES, category 3Cl is introduced in 2005. It is very small though. There are some visible but small changes in ISCED <1 (statistically significant), 2 and 3AB at the same time, which suggests that the instrument was slightly changed for these levels of education because the distributions are otherwise very stable or continuously changing for ES. Indeed, ES introduced a new questionnaire in 2005 (Eurostat, 2007d, p. 20).

In FI and FR, changes over EU-LFS quarters are relatively continuous, and no neighbouring quarters show statistically significant differences. The same applies to GR and HU. In GR however, ISCED <1 is not identified in the first quarter of 2004, which looks like an error. The distributions for IE reveal one break in the second quarter of 2004 and one outlier quarter, namely the

second quarter in 2003. With respect to the former, the generic category ISCED 3 is re-classified as ISCED 3AB, whereby that category grows significantly and substantially. With respect to the latter, ISCED 3 drops from 17.3 to 9.1 % and ISCED 3AB grows by approximately the same amount, from 5.6 to 14 %, which are both obviously statistically significant changes. In IS, ISCED 6 disappears after 2004; it is hard to tell if this is by design or if just no doctorate holders happened to be in the sample since 2004. Since the questionnaire in 2005 has a separate category for PhDs, it is probably rather a true 0 than a structural break.

With respect to IT, a first break occurs early in the observed period, in the second quarter of 2003. In addition to a change from 3Cs to 3Cl, the generic category ISCED 4 is abandoned and more specific categories, 4C and 5B, are used. The changes in ISCED 1 and 3AB between quarter 1 and 2 in 2003 are also statistically significant. A second break then occurs in the first quarter of 2004 because a new questionnaire was developed in order to better comply with EUROSTAT requirements (European Commission, 2006, p. 23). ISCED 3Cs is re-introduced, but with very low percentages. Neighbouring category ISCED 2 shrinks much more (statistically significant) than this change would imply, which can be explained by ISCED <1 and 3Cl increasing significantly. Also, the proportion of ISCED 6 decreases and 5A and 5B increase statistically significantly, suggesting that previously cases that did not fulfill ISCED 6 requirements were misclassified.

There are two breaks in LT, too: one in the first quarter of 2004 and another one in the fourth quarter in the same year. In the first break, the generic category ISCED 4 is abandoned and ISCED 4AB introduced. Moreover, ISCED <1 is differentiated from ISCED 1 and ISCED 3Cl is added, too. In the second

break, ISCED 3Cs is abandoned in favour of ISCED 3Cl, which consequently grows significantly.

For LU, the results are actually annual, so that survey quarters cannot be compared. There are substantial changes in the way ISCED is coded in LU, since the observed changes are too large for being explained by actual change. The following statistically significant changes can be observed: ISCED 2 decreases from 10.1 to 3.5 % between 2003 and 2004 and grows back to 9.5 % in 2005; 3Cs decreases from 15.3 to 5.9 % between 2004 and 2005; ISCED 3 (generic) decreases from 1.9 to 0.1 % from 2003 to 2004; and ISCED 5A increases from 4.2 to 11.2 % in the same year. In 2005, there is also a structural break, with categories ISCED 3, 4AB and 4C being abandoned.

In the case of LV, there is again a switch from 3Cs to 3Cl in the third quarter of 2004. However, there is also quite some fluctuation in ISCED 2 and ISCED 3AB, with the latter category ranging from 36.4 to 52 % within the observation period of 3 years. ISCED 4AB in turn decreases nearly monotonically, ranging from 17.1 to 10.1 %. None of these changes are statistically significant for neighbouring quarters though.

The distribution of educational attainment in NL reveals three breaks. From the third quarter of 2003 onwards, the generic category ISCED 4 is differentiated into 4AB and 4C, with so few cases in 4AB however that they do not show up in the relative frequencies with one decimal only. Also the generic ISCED '3 or 4' is abandoned and ISCED 3 is introduced (in its place probably), both again with so few cases though that they go undetected in Table B.3. The other two breaks are exclusively related to the introduction and subsequent withdrawal of ISCED 3Cs, which is only used in the third and fourth quarter of 2004. Curiously, there is a significant change between those two quarters in that category. Looking at the neighbouring categories,

it looks like in the other waves, these cases are classified as 3Cl, where the significant changes coincide with the introduction/removal of 3Cs. Somewhat strangely, a single case is classified as ISCED 4 in the second quarter of 2004.

NO shows neither structural breaks nor discontinuities within the populated categories. In the case of PL, there is again the break reclassifying cases from 3Cs to 3Cl in the third quarter of 2004. Additionally, ISCED 6 is only differentiated from 2004 onwards, when the data collection instrument was changed (European Commission, 2006, p. 24). PT shows one break with the introduction of ISCED 4 in 2004, which is however a small category only. SE and SI show neither structural breaks nor significant change across survey quarters. In SK, again ISCED 3Cs is reclassified to ISCED 3Cl in the third quarter of 2004. the UK does not have any discontinuities either.

Like with the ESS and EU-SILC education distributions before, the results of Table B.3 are formally summarised using Duncan's index of dissimilarity in Table 4.6. Since we have quarterly data for the EU-LFS, subsequent survey quarters are compared here.

The large majority of comparisons across subsequent quarters of the EU-LFS show little change. For twelve out of 26 countries however there are some remarkable discontinuities in at least one quarter where more than 4 % of the sample 'change' categories across survey waves. LV has five such discontinuities, IE three, LU and LT two, and AT, BE, CZ, EE, IT, NL, PL and SK have each one. Summarised over all quarters, IE, LT, LV and SK show the highest amount of change over EU-LFS quarters, and HU, NO and SE show least change.[57]

57 The the UK also belongs to this group, however, EU-LFS data for the UK are only included in the file for 2005 so that the observation period is much shorter than for the other countries.

TABLE 4.6: Duncan's Dissimilarity Index for educational attainment distributions across EU-LFS quarters

	2003 Q1-2	2003 Q2-3	2003 Q3-4	2003/4 Q4-1	2004 Q1-2	2004 Q2-3	2004 Q3-4	2004/5 Q4-1	2005 Q1-2	2005 Q2-3	2005 Q3-4
AT	1.3	1.9	1.2	16.3	1.3	0.4	0.8	0.2	0.5	1.1	0.9
BE	0.8	1.9	2.0	2.2	1.1	1.6	0.8	7.9	1.5	2.0	1.2
CY	.	.	.	.	1.8*	1.8	1.3	1.2	2.2	2.0	2.0
CZ	1.4	0.9	1.0	0.9	0.4	4.6	0.4	0.5	0.6	0.4	0.4
DE†	.	.	.	.	1.1	.	.	1.8	1.4	0.9	0.6
DK	1.2	1.1	0.9	1.3	1.6	1.1	1.5	1.1	1.1	1.5	0.4
EE	3.0	2.2	2.1	2.0	1.9	8.9	2.1	1.1	2.8	2.1	2.1
ES	0.6	0.7	0.7	0.7	0.6	0.3	0.6	2.2	2.1	0.9	0.6
FI	0.9	0.8	0.2	1.1	1.0	0.4	0.9	0.8	1.5	0.5	0.2
FR	0.6	0.4	0.5	0.5	0.7	0.4	1.0	0.7	0.5	0.5	0.5
GR	1.2	0.5	0.5	3.7	1.2	0.6	0.5	0.4	0.5	0.6	0.6
HU	0.6	0.5	0.7	0.7	0.2	0.5	0.5	0.2	0.3	0.5	0.5
IE	9.6	11.6	1.0	0.6	21.8	0.9	0.9	0.7	1.1	0.3	0.6
IS	1.7	1.9	2.0	3.0	1.3	1.6	3.3	1.4	1.7	0.0	0.0
IT	10.2	0.9	0.5	3.9	0.9	0.5	1.4	0.7	0.6	0.9	1.2
LT	1.1	0.7	0.8	30.9	1.8	1.6	4.5	1.2	2.4	0.8	1.4
LU‡	.	.	.	18.1	.	.	.	17.3	.	.	.
LV	2.0	6.6	2.9	5.0	3.0	6.7	2.4	3.4	3.9	4.2	4.5
NL	0.5	4.6	1.3	1.2	0.9	3.1	2.6	3.5	0.6	0.8	0.6
NO	0.8	0.3	0.2	0.5	0.4	0.9	0.2	0.3	0.7	0.2	0.4
PL	0.2	0.8	1.2	0.9	0.3	34.4	1.0	0.6	0.3	0.5	0.9
PT	0.5	1.0	1.9	1.6	1.3	0.4	0.9	0.4	0.5	0.4	0.9
SE	0.2	0.4	0.3	0.7	0.3	0.3	0.5	0.3	1.2	0.6	0.4
SI	1.4	0.8	1.1	0.8	0.5	1.1	0.5	1.6	1.9	0.6	0.6
SK	0.7	0.5	0.6	0.5	0.3	37.5	0.8	1.0	0.4	0.5	0.8
UK	.	.	.	.	.	.	.	.	0.4	0.6	0.5
mean	1.9	1.9	1.1	4.0	1.9	4.8	1.3	2.0	1.2	0.9	0.9
min	0.2	0.3	0.2	0.5	0.2	0.3	0.2	0.2	0.3	0.0	0.0
max	10.2	11.6	2.9	30.9	21.8	37.5	4.5	17.3	3.9	4.2	4.5

Source: EU-LFS 2003–2005, quarterly files from Eurostat. Respondents aged 25–64. Weighted using the quarterly weighting factor (*coeff*). *Notes:* For some countries, there is no quarterly data for the whole time period. The comparisons are thus slightly different:
* = data from Q2 2003 are compared to Q2 2004
† = data from Q2 2003 are compared to Q2 2004 and from Q2 2004 to Q1 2005
‡ = data are compared over years since LU only provides annual data.

Duncan's dissimilarity index only detects breaks in the series when a substantial proportion of the sample is affected. There are however also structural breaks with little consequences for the overall distribution that give further evidence of inconsistent ISCED coding across survey waves. Table 4.7 gives more details on the categories affected by the breaks identified. Differences in percentages over EU-LFS quarters were additionally tested for stat-

TABLE 4.7: Overview of breaks and discontinuities in the educational attainment variable in the EU-LFS, 2003–2005

Country	break year/ quarter	EU-LFS ISCED categories deleted	added	shrinking	growing
AT	2004/Q1	4	3Cs; 4AB; 6	3AB	
BE	2005/Q1		<1	1	
CZ	2004/Q3	3Cs; 3			3Cl
DE	2005/Q1			2; 6	1
DE	2005/Q2			3AB	2
DK	2004/Q1	3			
EE	2004/Q3	3Cs			3Cl
ES	2005/Q1		3Cl	<1	
IE	2004/Q2	3			3AB
IT	2003/Q2	3Cs; 4	3Cl; 4C; 5B	1	3AB
IT	2004/Q1		3Cs	2; 6	<1; 3Cl; 5B; 5A
LT	2004/Q1	4	<1; 3Cl; 4AB		
LT	2004/Q4	3Cs			3Cl
LU	2004/Q1			2; 3	5A
LU	2005/Q1	3; 4AB; 4C		3Cs	2; 5A
LV	2004/Q3	3Cs	3Cl		
NL	2003/Q3	3 or 4; 4	3; 4AB; 4C		
NL	2004/Q3		3Cs	3Cl	
NL	2004/Q4				3Cs
NL	2005/Q1	3Cs			3Cl
PL	2004/Q1		6		
PL	2004/Q3	3Cs	3Cl		
PT	2004/Q1		4		
SK	2004/Q3	3Cs	3Cl		

Source: EU-LFS 2003–2005, derived from Table B.3. Changes in category sizes (columns 'shrinking' and 'growing') only registered when statistically significant.

istical significance using a comparison of proportions test in custom tables in SPSS. Thereby we can identify which of the non-continuous changes in the distributions found using the dissimilarity index are too large for being explained by sampling variation. Discontinuities that are not statistically significant in the test comparing proportions across quarters are not included in Table 4.7.

To summarise, whereas most countries show one or even several breaks or discontinuities in the distribution of educational attainment over survey quarters, there are no breaks in the series in CY, FI, FR, GR, HU, NO, SE, SI and the UK. Fluctuations in these countries and non-break related fluctuations in

most other countries look either random or continuous, i. e. reflecting actual change such as educational expansion (usually increasing ISCED 3AB, 5B, 5A and 6, decreasing ISCED <1, 1 and 2; 3C and 5B often do not show a clear trend). It is quite impressive that an observation period as short as three years allows us to observe this. Fluctuations are larger when the sample size is smaller (see particularly LV, but also EE, IS and LT), and they are larger in countries using survey data than in countries using register data (these are DK, FI, NO and SE). Sample size and administrative data sources are thus important contributors to aggregate data reliability. The data are also remarkably stable for FR and HU.

Breaks in the series often seem to be related to changing data collection instruments in countries, and the updated instruments often allow a more detailed implementation of ISCED in the respective country: The generic categories 3 and 4 are among the ones most often deleted. Only in LU, the more specific categories 4AB and 4C were abolished in favour of the generic ISCED 4.

One other specific type of break, whereby cases in ISCED 3Cs are reclassified to ISCED 3Cl, could be observed in eight countries: in CZ, EE, LV, PL and SK in the third quarter of 2004, in LT one quarter later, in NL in the first quarter of 2005 and in IT already in the second quarter of 2003. My impression is that the change in criterion announced in Commission Regulation (EC) No. 430/2005 (European Commission, 2005a) for 2006 to differentiate 3Cs and 3Cl using a duration of *two* years (rather than three years, as before) was already implemented in the data from 2004 onwards. This is however not indicated in the EU-LFS user guide (Eurostat, 2006a).

The differentiation of 3Cs and 3Cl is very important for statistics produced by EUROSTAT and OECD, because when educational attainment data are ag-

gregated into the three broad categories commonly used for publications by these bodies (ISCED 0-2: low; ISCED 3-4: medium; ISCED 5-6: high), ISCED 3Cs is put in the 'low' category, whereas ISCED 3Cl is considered as completion of upper secondary education and thus put in the 'medium' category. It however seems that exactly this boundary is difficult to draw. The change in criterion means that the educational attainment distributions for all affected countries are dragged upwards by a substantial degree without any underlying actual change.

EUROSTAT does not require NSIs to re-deliver updated files for older quarters to harmonise them with later quarters. Often it would not be possible to 'harmonise backwards' anyway, because changes in instruments cannot be reproduced for earlier surveys. However, if the specification for some ISCED category is changed and consequently some mapping of ISCED to a country-specific category, this could be implemented in older files, e. g. when all cases in ISCED 3Cs were re-classified to ISCED 3Cl in a number of countries, since there is no country in which only part of the 3Cs category was re-allocated.

So how do the results of the three previous sections compare? Are all three surveys equally stable or unstable? Obviously larger sample sizes lead to more consistent results over survey waves (as measured by D), as do shorter intervals between data collection time points and a survey being used to produce official statistics and thus relying on the expertise on education statistics in NSIs and at EUROSTAT. All these factors work to the disadvantage of the ESS and in favour of the EU-LFS. However, all three surveys showed evidence of inconsistent coding of ISCED over years. What is promising is that usually changes lead to an improvement in the application of ISCED to the

country-specific educational qualifications, be it by correction of misclassifications where the coding in an earlier survey round violates comparability by not sticking to ISCED definitions, be it by more differentiated data collection instruments that allow distinctions that could not be made in earlier waves of a survey. The fact that the former type of change is not implemented 'backward' in earlier survey waves however means that there is less comparability over time than could be achieved. Also there are some inconsistencies that are left unexplained because the CSEVs are not available for the EU-LFS and EU-SILC.

4.3 CONSISTENCY ACROSS THE THREE SURVEYS

Previous research has shown that data published by the OECD and academically driven survey data such as the ESS show substantial discrepancies (see Section 3.1.1). In the light of the differences found across survey rounds in the previous section, this is not surprising. Hudson (2007), however, only shows discrepancies using the very aggregated 3-level version of ISCED 97, summarising levels 0 to 2 (low education), 3 and 4 (upper secondary education) and 5 and 6 (tertiary education), because these are the categories that OECD's "Education at a Glance" Series (EAG) distinguishes. This means that inconsistencies *within* these three broad levels are not picked up. Looking at the six-level or even more detailed versions of ISCED 97 in different surveys might allow more specific conclusions about where exactly these discrepancies result from. Therefore, in this section, the distributions of educational attainment according to more detailed versions of ISCED 97 will be compared across ESS, EU-SILC and EU-LFS data. Since data for EAG are for most countries

derived from EU-LFS data for EU member states, a comparison with EAG data will not be made.[58]

Since the three surveys do not use identical codings of ISCED 97, they firstly need to be further harmonised. The EU-SILC data contain the most simplified ISCED coding with 6 levels only. Therefore, the educational attainment variables in the ESS as well as EU-LFS are recoded to the same scheme. Furthermore, because of the rotating panel design in the EU-LFS, the quarterly files cannot be simply aggregated in order to achieve yearly data. It was thus decided to only use data from the spring quarter which is the most complete one: some countries did not yet provide data for the other quarters until 2005.

Table B.4 in the appendix shows the combined data from tables B.1, B.2 and quarter two in table B.3, but organised slightly differently: The data are now ordered by country, survey and the year the survey was conducted.[59] We can now compare the distributions of educational attainment according to the six-level ISCED variable across data sources for the same or close years, in order to detect systematic coding differences across data sources.

Table 4.8 summarises the results using Duncan's dissimilarity index, in a similar vein as in Section 4.2. Here the comparison is however not made across time points within surveys, but across surveys within time-points. Since there are three survey sources and (roughly) four time points (2002/2003; 2004; 2005; 2006/2007) but the surveys do not span the time-points equally, Table 4.8 gives six pairwise comparisons:

– Column one compares ESS round one from 2002/2003 with EU-LFS 2003;

58 Even for those countries where data are delivered to OECD directly by the NSI, the data source is usually identical with the one entering the EU-LFS, i. e. the national LFS.

59 In the case of the ESS, the year most cases were surveyed in is given—in many countries, the data collection period was in the winter and thus spanned across two years.

– column two compares ESS round two from 2004/2005 with EU-LFS 2004 or 2005 (depending on whether the ESS data for the respective country were collected in 2004 or 2005);
– column three compares EU-LFS and EU-SILC 2004;
– column four compares the same surveys, but for 2005;
– column five compares ESS round two from 2004/2005 with EU-SILC 2004 or 2005 (again depending on whether the ESS data for the respective country were collected in 2004 or 2005) and
– column six compares EU-SILC 2006 with ESS round three from 2006/2007.

This means that surveys are compared within years, and if two surveys were not conducted in the same year in a country, a one-year difference was allowed.

In AT, we first of all find differences in the application of ISCED 97 at the lowest levels of education: All three surveys handle levels 0 and 1 differently. EU-LFS ignores both, EU-SILC only covers level 1, and ESS covers both. However, since the proportion of primary and lower secondary education as the highest attainment is rather high in the ESS and ISCED levels 3, 5 and 6 are much smaller in the ESS than in the official surveys, there might be a systematic misclassification of qualifications in the ESS. Duncan's dissimilarity index (see Table 4.8) is also much higher for AT when the ESS is compared to EU-LFS or EU-SILC ($D \geqslant 40$) than when the latter are compared with each other ($D < 10$). This will be further examined when checking the harmonisation process in the ESS in Section 5.2.3. Although there are also differences between EU-LFS and EU-SILC, they are not quite as big as the differences with the ESS.

With respect to BE, the first two EU-LFS years are quite different from the first two ESS rounds and the EU-SILC. This changes with the break in EU-LFS 2005 already identified in Section 4.2.3. However, then the third round

TABLE 4.8: Duncan's Dissimilarity Index for educational attainment distributions across ESS, EU-SILC and EU-LFS

Country	EU-LFS-ESS		EU-LFS-EU-SILC		EU-SILC-ESS	
	2002/03	2004/05	2004	2005	2004/05	2006/07
AT	.	40.0	8.6	5.5	41.4	45.3
BE	12.7	16.8	11.8	6.0	8.5	34.1
CY	.	.	.	4.4	.	.
CZ	6.2	6.0	.	0.7	4.2	.
DE	9.7	9.8	.	16.5	16.7	11.6
DK	14.3	16.9	8.9	7.9	14.8	22.1
EE	.	5.0	7.8	4.2	4.8	9.7
ES	21.6	12.4	7.5	6.1	15.2	11.0
FI	7.2	7.7	12.9	11.2	12.9	14.1
FR	39.6	40.9	17.8	16.8	48.0	48.5
GR	14.4	9.4	4.8	5.0	10.9	.
HU	33.1	26.7	.	1.9	29.4	35.7
IE	15.4	15.2	5.0	5.4	18.1	18.2
IS	.	34.7	12.5	12.6	34.9	.
IT*	4.9	6.2	3.4	5.8	.	9.0
LT	.	.	.	2.3	.	.
LU	21.3	12.1	18.2	13.2	3.5	.
LV	.	.	.	14.1	.	.
NL	14.2	11.3	.	1.9	14.5	10.6
NO	4.1	20.1	3.8	2.3	11.8	19.9
PL	21.3	19.5	.	15.4	37.1	38.3
PT	7.5	3.8	2.1	0.9	5.1	2.4
SE	33.9	24.2	4.2	4.3	31.6	16.6
SI	34.6	31.7	.	24.2	29.8	30.0
SK	.	20.5	.	4.7	7.0	8.7
UK†	.	29.6	.	11.4	.	26.3
min	4.1	3.8	2.1	0.7	3.5	2.4
mean	17.6	18.3	8.6	7.9	19.1	21.7
max	39.6	40.9	18.2	24.2	48.0	48.5

Sources: ESS 2002–2007, EU-SILC 2004–2006, cross-sectional files from Eurostat, EU-LFS 2003–2005, files from Eurostat (second quarter used only). Own calculations. Respondents aged 25–64. Weighted using the design weight (*dweight*) in the ESS, the cross-sectional weighting factor (*pb040*) in EU-SILC and the quarterly weighting factor (*coeff*) in the EU-LFS.
Notes:
* = Data for ESS round two for IT were only collected in 2006, they are still compared with EU-LFS 2005.
† = Since for UK, EU-LFS data are only available for 2005 and ESS data for 2002 and 2006, the comparison between EU-LFS 2005 and ESS round three is shown.

of the ESS is way off the other data sources for all ISCED categories but the highest. Therefore, it looks like the re-mappings implemented in this ESS round harmed rather than improved comparability, as was already suggested in Section 4.2.1. Altogether, EU-SILC, ESS rounds one and two and EU-LFS 2005 seem to be rather comparable. The dissimilarity indices in Table 4.8 confirm this.

For CY, we only have data from the EU-LFS and EU-SILC, and only one year (2005) overlaps. The data sources match rather well, although EU-SILC records overall higher levels of education than the EU-LFS. Comparing all EU-LFS waves to all EU-SILC waves leads to a dissimilarity index of 5.1.

In CZ, ISCED level 1 is identified in EU-SILC and the EU-LFS, but not in the ESS. EU-SILC in turn does not identify level 0 in 2005. The break in EU-LFS 2005, re-classifying qualifications formerly assigned to 3Cs (and thus ending up in level 2 in the more aggregated version of ISCED 97) to 3Cl improves the fit across data sources: these qualifications were classified as level 3 rather than 2 in the other surveys from the start. The definition of 'upper secondary completion' thus differs across surveys. Otherwise, the data are, compared to other countries, pretty consistent.

For DE, we observe that EU-SILC 2005 is an outlier with respect to the highest ISCED category. The respective value for the third ESS round also appears too high. The value for EU-SILC 2006 seems to be more correct; something we could not conclude from just looking at EU-SILC over time in Section 4.2.2. ISCED 2 and 3 also do not look right in EU-SILC 2005, being considerably smaller than in the other surveys and the other EU-SILC wave. This also shows up in relatively high dissimilarity indices in Table 4.8 whenever EU-SILC 2005 is included in the comparison ($D > 15$). The ESS in turn differs from the other data sources at ISCED levels 1, 2 (categories are smaller in the

ESS) and level 3 (category is larger in ESS rounds one and two, but not three). ESS round three shows a larger ISCED 4 category. None of the surveys thus match really well: If the dissimilarity index is computed across all years, simply comparing ESS with EU-SILC, EU-SILC with EU-LFS and EU-LFS with ESS, it amounts to 9 to 10 for all three comparisons.

With respect to DK, there are strong differences between the ESS and the two other surveys because of the very different composition of ISCED level 4, being nearly empty in EU-LFS and EU-SILC, but going up to 16 % in the ESS. In turn, ISCED 2 and 3 are smaller in ESS rounds two and three, and ISCED 5/6 in ESS round one. This drives the large dissimilarity indices when the ESS is involved in the comparison. Additionally, whereas EU-SILC does not identify level 0, the other surveys do. In EU-SILC, ISCED level 2 is also substantially larger than in the other surveys.

EE shows comparatively little differences across surveys, all dissimilarity indices being below 10. The major reason for this is probably that the data collection instrument used in the different surveys is highly consistent, if not identical. However, we see the same effect as in CZ with the 3C-related break in the EU-LFS, which improves the match between the EU-LFS and the other surveys at levels 2 and 3. A look at levels 4 and 5 shows that the conclusion reached in Section 4.2.1 on the consistency over ESS rounds was right: the re-classification of 'professional/technical school after secondary education' to level 4 decreases comparability—this is classified as ISCED 5B in the other surveys.

In ES, the ESS is again the outlier with respect to ISCED levels 0 and 1. In round one, ISCED level 4 also is much larger than in the other surveys or ESS rounds. ISCED 5/6 is smaller in ESS rounds one and three. The break in ESS round two however has improved the match between ESS and the other

surveys at least at the higher levels of education. The break in EU-SILC is hard to evaluate because of the instability of levels 2 and 3 across surveys *and* time. The later EU-SILC waves are closer to the EU-LFS at level 1, but further away at level 2. But the differences between these two surveys are not very large ($D < 10$).

FI is, as DE, a rare example where EU-LFS and ESS lie closer together than any of the two other combinations (see Table 4.8). The reason is that in EU-SILC, ISCED levels 0 and 1 are not identified and level 2 is consequently as big as 0, 1 and 2 together in the other surveys. Thus like in AT, we find inconsistent treatment of the lowest categories in the different data sources. In addition, the ESS does not identify the (tiny) level 4, which the other surveys do. Whereas the ESS consistently shows lower levels of upper secondary attainment, the highest category is more populated in ESS rounds two and three than in the other sources.

FR shows huge differences across surveys, and whenever the ESS is involved in the comparison, FR shows the highest index of dissimilarity across all countries (around 40 for the comparison with the EU-LFS and 48 for the comparison with EU-SILC). ISCED 2, 4 and 5/6 are consistently larger in the ESS than in the other sources and ISCED 3 is consistently smaller. However, EU-SILC and EU-LFS don't match particularly well either. All surveys seem to construct ISCED levels 0, 1 and 2 differently, with EU-SILC showing the highest numbers of respondents in ISCED 0 and the lowest number in ISCED 2. FR had many cases coded as missing on the EU-SILC education variable because they had not achieved *any* educational qualifications (see Section 4.1.2). The other surveys must have dealt with these differently, i. e. by classifying them according to their highest level of education attended or completed—in this case *collège* ('lower secondary school')—rather than *successfully* completed

with the corresponding certificate, *brevet du collège*. Examinations are known to be highly selective in FR, which is why the exact operationalisation of 'educational attainment' makes quite a difference in French data on educational attainment.

For GR, again the ESS stands out a little as matching less with EU-SILC and EU-LFS than these do with each other. The ESS under-represents primary and tertiary education and over-represents ISCED 0 and 2 compared to the other surveys. With the second round however the ESS moved into the right direction (although the data collection instrument was not changed substantially). EU-LFS and EU-SILC are reasonably close in GR, with $D \leqslant 5$.

In HU, EU-LFS is the only survey that does not identify ISCED level 0. Again, we find large differences between the ESS on the one hand and the EUROSTAT surveys on the other at ISCED levels 1 (ESS category larger) and 3 (ESS category smaller). Additionally, in ESS rounds one and three ISCED level 2 is larger than in EU-SILC and EU-LFS; in turn in ESS round two, ISCED 5/6 is larger. The dissimilarity index accordingly shows a quite extreme pattern with EU-LFS and EU-SILC being very close in 2005 with $D = 1.9$ (if all EU-LFS and EU-SILC waves are compared, it is $D = 3.4$, not shown); and all indices involving the ESS being very large ($26.7 < D < 35.7$). ISCED was most probably constructed differently in the ESS and in the EUROSTAT surveys.

Similar, but much less extreme findings can be reported for IE. Again the ESS matches the two other surveys least ($D > 15$), which match reasonably well ($D \approx 5$). Particularly the drop in ISCED level 1 in the third ESS round is worrying since the category is more than twice as large in the other surveys. Also ISCED level 4 is highly irregular, with EU-SILC and EU-LFS showing 9 to 12 % of the sample in this category, but the ESS 18 to 23 %. At level 5, the inverse is true, with the ESS showing considerably lower proportions than the

other surveys. Again, there is reason to assume that ISCED was constructed differently in the different surveys.

IS shows the same pattern with the ESS showing a considerably different educational attainment distribution than EU-SILC and EU-LFS ($D \approx 35$). Although the sample for IS is much smaller than all other samples ($N = 341$), this alone cannot explain the considerable deviation of the ESS from the other data sources—different classification of country-specific categories in ISCED is the more probable explanation (which will be shown in Section 5.2.3). However, EU-SILC and EU-LFS also differ from each other, though to a lesser degree ($D \approx 13$). These latter differences however span across all levels of education.

IT overall shows rather low dissimilarity indices, all $D < 10$. At ISCED level 4, EU-SILC differs visibly from the ESS and EU-LFS, and all surveys differ from each other at level 3 with ESS showing the highest and EU-SILC the lowest percentages. For LT, like for CY, there are no ESS data available yet, and EU-SILC started in 2005. There is thus only one dissimilarity index reported in Table 4.8, which is very low. The earlier EU-LFS waves differ from the 2005 one because of the changes in the ISCED assignment of 3C qualifications (see Section 4.2.3).

LU is the only country where EU-SILC and ESS lie closer to each other than EU-LFS and either other survey—and they are pretty close ($D = 3.5$). There must be something peculiar about the coding of educational attainment in the EU-LFS, for which we had already observed quite strong changes over time in Section 4.2.3. EU-LFS for 2003 reports considerably lower numbers of tertiary education graduates and more post-secondary non-tertiary graduates than the other surveys. All EU-LFS waves feature more ISCED 0 and 2 attainment and less ISCED 1 attainment than the other surveys. The differences are so

systematic that it looks like different ISCED mappings were applied in the EU-LFS and EU-SILC in LU.

The data situation for LV again allows only one comparison to be made: EU-LFS and EU-SILC 2005. In contrast to CY and LT, both surveys differ considerably from each other for LV. However, EU-SILC changed considerably in 2006 and is then much closer to the EU-LFS. It thus seems that there is a specific problem with the EU-SILC 2005 data in LV, particularly with respect to ISCED levels 1 and 2. The reason is almost certainly what was observed a few times already for especially Central and Eastern European countries: ISCED level 2 qualifications were probably misclassified as ISCED level 1, which was corrected in 2006.

In NL, the distribution of educational attainment is very similar for EU-LFS and EU-SILC. The ESS differs from both of these surveys at all levels, although it seems to get closer over time (without any change in the instrument though). ISCED levels 1, 3 and 5/6 are smaller and ISCED 2 and 4 larger in the ESS than in the EUROSTAT surveys of the same (or the next) year.

For NO, we see pronounced differences between data collected by interview (ESS rounds two and three) and register data (ESS round one, EU-LFS and EU-SILC). All register data produce highly similar educational attainment distributions ($D < 5$), whereas the comparison with ESS rounds two and three shows substantial differences between distributions across surveys ($10 < D < 20$). ESS rounds two and three show more ISCED level 5/6 attainment and less ISCED level 3 attainment. In round three additionally ISCED level 4 is much larger than in any other survey or ESS round. EU-SILC 2006 data differ from the other data because of a change in the official ISCED assignments in 2006 (see Section 4.2.2).

PL is again a country with strong differences across surveys, at a similar scale as AT and FR. None of the surveys match well with all dissimilarity indices exceeding 15. EU-LFS differs from the other surveys in that ISCED level 1 is nearly empty, whereas both ESS and EU-SILC record 14 to 17 % of cases in this category. EU-SILC in turn reports ISCED level 2 as empty, whereas the ESS reports around 35 % in this category and the EU-LFS even 50 % in 2003 and 2004. This drops to only 15 % in 2005 because of the change in the allocation of vocational upper secondary programmes to 3Cs and 3Cl (see Section 4.2.3). With respect to ISCED level 3, EU-LFS 2005 and EU-SILC are close, but the earlier EU-LFS years and the ESS differ (but are close to each other). ISCED levels 4 and 5/6 are much more consistent across the three surveys and time. Therefore, in the case of PL, the distinction between ISCED levels 1 and 2 on the one hand and levels 2 and 3 on the other seems to be problematic and handled differently by the different surveys.

PT is one of the few countries with all dissimilarity indices being below 10. But even then, the EU-LFS and EU-SILC are closer to each other than any of the two with the ESS. The ESS however seems to come closer to the other distributions over time. ISCED level 4 is identified in the EU-LFS and EU-SILC, but not in the ESS—it is however very small.

In the case of SE we again find a strong dissimilarity between the ESS and the official surveys. Whereas the EU-LFS and EU-SILC produce reasonably similar educational attainment distributions ($D < 5$), the ESS is rather far off ($15 < D < 35$), particularly in the earlier rounds. In rounds one and two, the ESS reports 16–17 % of the cases in ISCED level 1, whereas EU-LFS and EU-SILC count 5–8 %. At level 2, the ESS also reports about twice as many cases as the other surveys, but in round three it gets closer. For level 3 this is then the other way round, with the official surveys counting many more cases

than the ESS, and again with the difference shrinking over ESS rounds. At level 5/6, the ESS reports around 10 % more cases than the EUROSTAT surveys. The ESS is the only survey to identify ISCED level 0 (very small), but it is also the only one not to identify ISCED level 4 (non-negligible).

SI shows the worst match across all surveys of all countries, with the dissimilarity index ranging from 24 to 35. This is in stark contrast to the stability that was found across ESS rounds (see Section 4.2.1). In the ESS, ISCED levels 0 and 2 are larger, and ISCED level 3 smaller than in the other surveys. In the EU-LFS, ISCED level 1 is much smaller, and in EU-SILC, ISCED level 2 is smaller. Level 3 is at least close between the EU-LFS and EU-SILC. In contrast to the other surveys, the EU-LFS does not identify ISCED level 4 and these cases are included in level 3. What EU-SILC thus reports as level 4 is reported as 5/6 in the EU-LFS. The ESS seems to report as level 4 respondents that would be coded level 3 in the other surveys since ISCED 5/6 is close to the EU-LFS and the sum of levels 4 and 5/6 in EU-SILC. ISCED is thus constructed very differently in all tree surveys in the case of SI.

In SK, the best match is between the EU-LFS and EU-SILC ($D = 4.7$), the worst between the ESS and EU-LFS ($D = 20.5$), and the comparison of EU-SILC and ESS is in the middle ($D < 10$). There is large diversity across surveys in the size of ISCED level 2, ranging from 6 % in EU-SILC 2006 to 51 % in the EU-LFS 2003. The change in the allocation of vocational upper secondary programmes from 3Cs to 3Cl and thus from ISCED level 2 to 3 makes the EU-LFS come closer to the other two surveys at levels 2 and 3. ISCED level 4 is only identified in the ESS. With respect to level 5, EU-SILC records more cases than the other surveys.

Finally, for the UK, only three comparisons can be made. The match of the educational attainment distributions in the three surveys is not very

good, with even the EU-LFS and EU-SILC showing an index of dissimilarity of D = 11.4. One of the reasons for this is that, as will be shown in Section 5.2.2, in the EU-LFS, all respondents who indicated to have 'other' qualifications are assigned to ISCED level 3. In EU-SILC in turn, they are coded as missing. The latter strategy is probably preferable in terms of validity and cross-national comparability. However, the amount of people giving this response in Britain does pose a problem that cannot be solved by recoding alone.

The fit with the ESS is even worse, however, producing dissimilarity indices larger than 25. As discussed in Schneider (2008a), the delineation of ISCED levels 2 and 3 is very debated in the case of the UK. The official surveys use the official mapping, whereas the ESS seems to use the cross-nationally more adequate mappings proposed in Schneider (2008a), classifying *General Certificate of Secondary Education* (GCSE) as ISCED level 2 rather than 3: level 2 is much larger and level 3 much smaller in the ESS than in the EUROSTAT surveys. The latter surveys do not identify ISCED level 1. All three surveys report very different percentages for ISCED level 4, and at levels 5/6 there are noticeable differences, too.

To summarise, when comparing the distribution of the ISCED variables in different survey data sets, large differences can be observed between data sources that cannot be reconciled in any obvious way. EU-LFS and EU-SILC show the smallest cross-survey differences with an average dissimilarity index across countries of 8 to 9 %. The differences across surveys are much larger as soon as the ESS is included in the comparison: The average dissimilarity index comparing ESS and EU-SILC on the one hand and ESS and EU-LFS on the other hand amount to around 20 %. There are however quite large discrepancies in specific countries between EU-LFS and EU-SILC, too: In five out

of 15 countries in 2004 and in nine out of 26 in 2005, the dissimilarity index lies above 10 %. CZ, EE and PT are the countries with the lowest discrepancies across all surveys (D is consistently smaller than 10), and AT, FR and SI the countries with the highest (D here lies around 30 on average across all six comparisons).

Although the differences between the EU-LFS and EU-SILC are smaller than those between each of those and the ESS, they are still worrying, since EUROSTAT is centrally responsible for both surveys, and the education variables in both surveys are coded by the NSIs. This is however obviously done in rather different ways in a number of countries. The quality guideline that "variations in methodology that might affect data values should not be made without explanation" (OECD, 2003b, p. 10) is not taken seriously enough, since the EUROSTAT documentation does not highlight any deviations in methodology for these countries. Most probably, neither EUROSTAT nor the NSIs were aware of some of them.

The comparison of the three surveys thus suggest inconsistencies across surveys and countries that require further investigation. This will be done in the next chapter, where the data collection instruments and harmonisation procedures will be examined more closely.

5

CONSISTENCY OF DATA COLLECTION INSTRUMENTS AND HARMONISATION PROCEDURES

The previous chapter focused on the consistency in the *outcome* of measurement, i. e. actual data. It was diagnosed that the distributions of educational attainment coded in ISCED 97 differ more than actual change over time within surveys can plausibly explain. Substantial inconsistencies were also found across surveys, despite the fact that all three surveys were conducted within five years and follow similar methodologies (e. g. random sampling, ex-ante output harmonisation). This chapter will have a closer look at the *generation* of the educational attainment distributions, i. e. the *input* in terms of data collection, measurement instruments and harmonisation procedures. Consistency across countries is thus examined by checking if countries use consistent methodologies for measuring educational attainment using country-specific data collection instruments and for harmonising their nationally specific education categories into ISCED 97.

Eurostat (2006a) acknowledges that the detailed educational attainment variable in the EU-LFS often lacks comparability over countries, without giving any further detail though (p. 129). Comparability across countries is examined here from two angles: Firstly, in Section 5.1, the questionnaire items on educational attainment in the three surveys as well as more general characteristics of the data collection process will be examined in some detail to highlight differences in the way countries measure educational attainment.

Secondly, we need to know if countries apply the ISCED 97 definitions and thus code the harmonised variable in the same way. This will be treated in Section 5.2.

5.1 CONSISTENCY OF DATA COLLECTION INSTRUMENTS

This subsection examines country-specific instruments for measuring educational attainment. The cross-national consistency of country-specific measurement instruments will be assessed by an examination of the data sources and data collection modes, the question wordings, and the response categories for educational attainment. The particular aspects to be discussed are

1. methods of data collection (register or survey data, data collection mode, proxy reporting, Section 5.1.1);
2. the specific operationalisation of the concept 'educational attainment' (Section 5.1.2);
3. the level of detail the measurement instruments record and potential problems in the application of ISCED to variables that lack specific details (Section 5.1.3); and
4. coverage (or not) of different sectors of educational systems, such as vocational education, non-formal education, special education and adult education (Section 5.1.4).

5.1.1 *Data sources and modes of data collection*

Table 5.1 gives an overview of data sources (register or survey), data collection modes in surveys (Computer-Assisted Personal Interview (CAPI), Computer-Assisted Telephone Interview (CATI), Paper and Pencil Interview (PAPI) or Self-Administered Mail Questionnaire (SAMQ)) and the extent of proxy reporting across countries in the EU-LFS, EU-SILC, and ESS.

TABLE 5.1: Data sources and collection modes in ESS, EU-SILC and EU-LFS

Country	EU-LFS 2005 source/mode	EU-LFS 2005 by proxy (%)	EU-SILC 2005 source/mode	EU-SILC 2005 by proxy (%)	ESS mode
AT	PAPI	27.6	CAPI	24.6	PAPI
BE	PAPI/CAPI	22.6	CAPI	14.3	CAPI
BG	PAPI	41.5	.	.	PAPI
CH	CATI	0.4	.	.	CAPI
CY	CAPI	29.9	CAPI	13.4	PAPI
CZ	CAPI	48.1	PAPI	9.3	PAPI
DE	CAPI/SAMQ	26.6	SAMQ	11.9	CAPI
DK	register/CATI	2.6	register/CATI	49.1	CAPI
EE	PAPI/CAPI	15.3	CAPI	5	PAPI
ES	CAPI	52.9	CAPI	40.3	CAPI
FI	register/CATI	6.9	register/CATI	23.8	CAPI
FR	CAPI	32.1	CAPI	26.9	CAPI
GR	PAPI	43.6	PAPI/CAPI	5.4	PAPI
HU	PAPI	42.7	PAPI	10.4	PAPI
IE	CAPI	43.1	CAPI	31	PAPI
IL	.	.	.	.	PAPI
IS	CATI	0.8	register/CATI	0	CAPI
IT	CAPI	40.3	PAPI	16.1	CAPI
LT	PAPI	43.2	PAPI	14	.
LU	CATI	52.4	PAPI	22.8	PAPI
LV	PAPI	39.9	PAPI	5.8	PAPI
NL	CAPI	46.6	CATI	39.6	CAPI
NO	CATI	13.7	register/CATI	28.1	CAPI
PL	PAPI	41.6	PAPI	19.3	PAPI
PT	CAPI	45.8	CAPI	13.9	PAPI
RO	PAPI	28.2	.	.	PAPI
RU	.	.	.	.	PAPI
SE	register/CATI	2.8	register/PAPI/CATI	3.1	CAPI
SI	CAPI	57.6	register?/PAPI	24.2	PAPI
SK	PAPI	61.6	PAPI	5.9	PAPI
TR	CAPI	.	.	.	PAPI
UA	.	.	.	.	PAPI
the UK	CAPI	34.4	CAPI	10.8	CAPI

Source: Eurostat (2007b,d, 2008a), ESS Data documentation reports from NSD (Jowell and the Central Co-ordinating Team, 2003, 2005, 2008).
Note: With respect to EU-SILC, only the dominant mode is reported if more than 80 % of interviews are conducted with that mode. For the ESS, information refers to the last round in which the country participated.

5.1.1.1 *Use of register data*

In the EU-LFS, according to Eurostat (2007b), DK, FI and SE use register data for educational attainment. The questionnaires for DK and FI however also include items on educational attainment, probably in order to complement

register information. For EU-SILC, the 2005 comparative quality report (Eurostat, 2007a, p. 17–18) indicates that DK, FI, IS, NL, NO, SE and SI make some use of register data. It is not entirely clear which countries use register data for the measurement of *educational attainment* though, since Eurostat (2007a) does not give details on which *variables* are derived from register data and which from survey data. For IS and SE, data collection instruments on educational attainment could be identified in the questionnaire. These countries thus either combine register and survey data or use survey data only for educational attainment. For NL, although the instrument itself is not included in the questionnaire provided with the data, there is a placeholder for a block on educational attainment from a 'basic questionnaire' that is *not* provided. NL does not have register data for educational attainment (and the same can be assumed for SI). In the first round of the ESS, NO drew information on respondents' educational attainment from administrative data sources. In all other countries and ESS rounds, all data are survey based.

Generally register data can be expected to be of high precision and reliability because there are no issues with recall biases or the interpretation of questionnaire items and response categories by the respondent (Halldén, 2008, p. 265). However, registers could have missing data like missing entries for recent immigrants and foreigners and missing or inadequate information on education achieved by nationals abroad. Registers can also happen not to be completely up-to-date because of delays in the reporting of degrees from educational institutions to the NSIs, and register errors can occur.

5.1.1.2 *Data collection mode in surveys*

In the survey based data collection in the EU-LFS, EU-SILC and ESS, there is a mix of data collection modes, ranging from SAMQ to PAPI, CAPI and

CATI. Data collection mode for EU-SILC differs by and sometimes also within countries (Eurostat, 2008a, p. 18–20). In 2005, in nine countries (AT, BE, CY, EE, ES, FR, IE, PT, the UK), more than 90 % of the first interviews are conducted as CAPI (subsequent panel waves are usually administered by CATI). In five countries that rely on register data for much of the information required for EU-SILC (DK, FI, IS, NL, NO), CATI is the preferred method of data collection. In nine more countries (CZ, HU, IT, LT, LU, LV, PL, SI, SK), the traditional PAPI dominates, and GR and SE mix PAPI and CAPI/CATI respectively. DE is the only country where interviews are entirely self-administered. In the other countries, mail questionnaires are used in less than 5 % of the samples.

In the EU-LFS, first interviews should be personal interviews, although in DE around 15 % of the interviews are self-administered.[60] However, CH, IS and LU use CATI. In 2005, eleven countries used PAPI and twelve CAPI. DK, FI and SE rely on CATI in addition to register data, like in EU-SILC. Therefore, 19 countries use Computer-Assisted Interview (CAI) techniques altogether for the EU-LFS.

There is much less variation in the data collection modes in the ESS than in the EU-LFS or in EU-SILC: All countries collect their data through personal interviews. Countries use either CAPI (largely in Western and Northern European countries) or PAPI (largely in South-Eastern and Eastern European countries as well as AT, IE, IL, LU and PT). BE, ES and NL moved from PAPI to CAPI in the second round of the ESS.

It is certainly desirable to use CAI techniques since this facilitates data collection (e. g. by the use of more specific filters), leads to less item non-response,

60 Since participation in the Mikrozensus—the survey underlying the German EU-LFS data—is compulsory in DE and it is legally problematic to impose a visit by an interviewer on households, respondents can opt for a mail questionnaire.

and coding errors can be diagnosed and corrected already during the interview (Groves, 2004). In countries that use CAI, more complex instruments for collecting information on educational attainment can be used without too much increasing the burden on the interviewee. For the Dutch LFS for example, the programmed questionnaire uses a search engine linking the interviewees' indicated level of education to a database of educational programmes and qualifications. In this way, detailed information can be gathered without presenting a long list of qualifications to the interviewee. The open response is coded instantaneously, and if the respective qualification cannot be identified in the data base, the respondent is prompted to think about other names for the qualification in question.[61] At the other extreme end, DE exclusively relies on SAMQs for the EU-SILC data collection, which might lead to rather poor quality data since respondents cannot ask for support when encountering difficulties filling in the questionnaire. This could be especially problematic for less educated (or even illiterate) respondents. The items on educational attainment in the German questionnaire are however not very complex.

5.1.1.3 *Proxy reporting*

In household surveys, it is common practice that one respondent (usually the 'head of the household') reports for all household members, especially if these are not available at the time of interview. Interview by proxy is allowed in both EU-SILC and EU-LFS (including the education variable) since mostly factual data are collected. This might lead to problems especially if a proxy is asked to report detailed information on specific educational qualifications

61 The software 'Blaise' for developing CAI questionnaires, which is increasingly used by NSIs, is actually developed by Statistics Netherlands.

of another household member. For the register countries, proxy information is not an issue for the measurement of educational attainment since the information for each sampled respondent is retrieved from administrative sources.

In EU-SILC, the rates of interviews achieved by proxy range from 0 to 49 % across countries, with a mean of 18 %. Quality might be affected due to high proxy rates for AT, ES, FR, IE, LU, NL and SI where the rate exceeds 20 % (Eurostat, 2008a, p. 20–21). ES and NL are most critical here (proxy rate of 40 % or higher). In the EU-LFS, the proxy rate ranges from 0 to 62 %, with a mean of 33 %, thus substantially higher than the rates for EU-SILC. Only in the register countries as well as CH and IS (all relying on CATI) the proxy rates are below 10 % (Eurostat, 2007d, p. 16). Proxy reporting is not possible in the ESS due to the subjective nature of most of the information collected (attitudes, values and the like).

It is recommended in Eurostat (2007c) that the impact of different data collection methods on educational attainment measures is investigated in-depth. Comparability of register and survey data would be particularly important to know more about: the changing education distribution for NO observed in Section 4.2.1 (page 110) is quite disconcerting in this regard. The implications of proxy reporting on data quality are also unclear, although available evidence suggests that proxies can report factual information (such as educational attainment) quite reliably (O'Muircheartaigh, 1991), but not as reliably as the individuals concerned (Alwin, 2007, p. 152). However, this might be increasingly problematic with the high degree of differentiation of educational systems today. These issues cannot be evaluated here in more detail, but should be the focus of future research.

5.1.2 *Target content of the data collection instruments*

Further sources of inconsistencies across countries are the actual question wording and choice of response categories that operationalise the concept 'educational attainment'. For cross-national research, it is crucial that all countries rely on the same indicator and operational definition of educational attainment in order to achieve comparable measures.

In order to evaluate the link between instrument and underlying construct, questionnaire items need to be 1. extracted from the original country questionnaires,[62] 2. translated into English,[63] and 3. analysed with respect to the educational attainment indicator used in the question itself and in the response categories: educational certificates and qualifications, 'successfully completed educational programmes', institutions or educational programmes reached or attended (see Section 2.1). Tables C.1, C.2 and C.3 in the appendix present the question wording for all countries, including a translation into English, for all three surveys.[64] Table C.4 summarises the results of the analyses, which are presented in detail in the following paragraphs.

62 With respect to the EU-LFS, questionnaires are only available from 2005 onwards (see Eurostat, 2009). It was impossible to identify the data collection instrument for educational attainment in the questionnaires for CY, HU and SK in EU-LFS, and CZ, NL and SI in the EU-SILC. For some countries, the LFS questionnaire was only available in English, but not in the original language (ES, FI, SI, TR). With respect to the ESS, the task is facilitated by the underlying common questionnaire, including standard numbering of items across all countries, and easy retrievability from NSD.

63 This was performed using firstly machine translation, the outcome of which was transformed into 'readable' English, often drawing on advice from native speakers. For IS, the questionnaire for the EU-LFS is available in English translation, and the education items are identical to the ones in EU-SILC.

64 The response categories are only shown for the ESS in Table D.1, but available in a separate file for the other surveys.

5.1.2.1 *Types of instruments and response options*

There are a number of ways in which educational attainment data can be coded initially in the interview. Across countries and surveys, the instruments range from multi-item measures, usually using filters (e. g. CH, DE, IE, IS, NL, NO and the UK in the EU-LFS and IE, IS, SE and the UK in EU-SILC), to very simple single-item questions with fewer response categories than there are ISCED levels (AT, BG, CY and FI in the ESS). Across the three surveys, the large majority of countries use single-item instruments with 10 to 15 response categories. In RU, interviewers are instructed not to read out the response categories and thus need to code the answer the respondent gives spontaneously.[65] Some countries however also have single items with relatively detailed lists of qualifications (BE in EU-SILC and LU in the ESS and EU-SILC). EE uses the same and DE very similar instruments in all surveys.[66] ES consistently uses an open question the responses to which are post coded. CY and IT consistently use rather simple items with relatively few response categories. Some countries use the same or similar instruments in EU-SILC and the EU-LFS, but a considerably more aggregated one in the ESS (e. g. IE, IS, the UK). In LU, ESS and EU-SILC use the same response categories, but not the same opening question. Yet in most countries, a different instrument is used for each survey.

In the EU-LFS, 13 EU member states report to use a list of the most common or even all educational programmes; four countries use an aggregated list of educational programmes; three EU and four other countries use an

65 This might also be the case in other countries, but cannot be identified if the interviewer instructions are not included in the questionnaires available.

66 In the EU-LFS, the instrument for DE uses two filter questions that exclude respondents without qualifications from the two main items. In the ESS (see table D.1) and EU-SILC, the 'no qualification' categories are included in the two items, so that the resulting information is equivalent. In the ESS, the item on vocational education allows multiple responses and has more categories than in the EU-LFS or EU-SILC.

open question; further three EU countries use a combination of an open question *and* a list of the most common educational qualifications (Eurostat, 2007c).[67] Whereas detailed lists of educational programmes should be easily mapped to ISCED, questionnaire items with aggregated lists of educational programmes might be problematic if the aggregations run across ISCED levels or categories (see Section 5.1.3). With respect to data collection by an open question, the quality of the resulting data largely depends on how reliably and to what level of detail they are coded, which is a black box for the data user.

In EU-SILC, all countries with the exception of BE use similarly or slightly less detailed measures than in the EU-LFS. BE uses a much more detailed measure in EU-SILC than in the EU-LFS. Still, the variation across countries is impressive, with the UK using a complex multi-item instrument and FR using only seven categories. Here, the question even asks respondents to use 'the following international classification' (*Quel est le diplôme le plus élevé que vous avez obtenu selon la classification internationale suivante ?*). It thus looks like FR chose an input harmonisation approach for the measurement of educational attainment in EU-SILC.

There is also a lot of variation in the level of detail of the response categories across countries in the ESS, although at a somewhat lower level: Whereas some countries only distinguish 5, 6 or 7 categories in their data collection instruments (AT, BG, CY, FI, the UK), some countries collect quite detailed information, with sometimes 15 'indigenous' categories or more (CH in rounds one and two, DE, for which a large number of categories can be constructed

67 This report is the result of a survey amongst NSIs organised by the EUROSTAT Working Group on Education and Training Statistics (ETS WG) on how educational attainment is measured in their LFSs (or equivalent surveys from which results are reported to OECD). It reports the results of the work of the ETS WG on 37 countries including 27 EU member states, two candidate countries, three European Free Trade Association (EFTA) countries and five non-European OECD countries (Australia, the US, Canada, Korea and Japan). Unfortunately countries are not named in this report, so the evidence is not as specific as one might wish.

by cross-tabulating the country-specific items, EE, ES rounds two and three, LU). No country uses complete lists of qualifications in the ESS though. Given the initial purpose of this survey and the anticipated usage of educational attainment as a background variable rather than a variable of interest in itself, this might be understandable. However, there are already publications using ESS data for analysing educational attainment as a main variable (e. g. Domanski and Przybysz, 2007; Eikemo et al., 2008; von dem Knesebeck et al., 2006), and since education is so closely related to many of the concepts covered by the ESS, it would be important to have good educational attainment data in the ESS for all countries. With very sparse information, the correction of misclassifications (see Section 5.2.3), let alone refinement of the cross-nationally comparable variable are ruled out.

To summarise, we find pronounced differences across surveys and countries in terms of the formal characteristics of the data collection instruments for educational attainment. The consequences of these differences are however difficult to evaluate. One aspect that might be consequential is however the differing amount of detail available for different countries and/or surveys (see Section 5.1.3).

5.1.2.2 *Content of questions and response categories*

So what about the actual content of data collection instruments on educational attainment in different countries and surveys?

When data on educational attainment are retrieved from administrative sources (common only in the Scandinavian countries), there is no information available in the survey documentation on the nature of these data, e. g. if they contain information on registration for educational programmes,

achievement of formal qualifications, or both, or other types of information. From other sources, however, it can be derived that Statistics Sweden's education register (*utbildningsregistret*) contains information on educational *certificates* as reported by the educational institutions that award them (Statistics Sweden, 2004). The same is true for Statistics Finland's 'Register of Completed Education and Degrees' (Statistics Finland, 2004, p. 45), which also includes information on the awarding educational institutions. In the case of DK, there are several related registers, the 'Attainment Register' covering data on completed general and vocational education, and the 'Student Register' on educational careers and achieved qualifications (Statistics Denmark, 2006, 2008). NO has its 'National Education Database' and a register of the populations' highest level of education which is based on certificates obtained (Statistics Norway, 2006). Therefore, in terms of the operationalisation of educational attainment, information on educational qualifications obtained in the formal education system can be derived from all register data used in the three European surveys. It is however not entirely clear which information is actually used in the surveys.

If data are collected through questionnaires, there are however pronounced differences across countries and surveys in the content of the questionnaire items for collecting data on educational attainment and thus in the specific underlying target concept.[68] Certificates are specifically mentioned in the question (see tables C.1, C.2 and C.3) in BG, CY, DE, GR, IT, RO and the UK in the ESS; in AT, BE, DE, FR, IS, IT, LU, SE and the UK in EU-SILC; and in BE, CH, DE, FI, FR, IS, IT, LU, NL, TR and the UK in the EU-LFS. Although educational certificates are therefore the proxy most used in the question for operationalising

68 For the ESS, the questionnaires were available in several languages for multilingual countries (e. g. BE, CH, EE, FI, LV, UA), and all versions were analysed.

educational attainment,[69] it does not form the absolute majority. '(Level of) education completed' or 'finished'[70] is a close runner-up. The meaning of 'level of education achieved' (or 'attained', 'reached', 'obtained', 'acquired') is very close to (but not identical with) 'level of education completed' and is also widely used.[71] Rare is the reference to the highest level of education 'attended', 'taken' or 'received', which clearly measures something different from successful completion of educational programmes.[72] In the EU-LFS, FR and NL measure both certificates obtained and grades/educational programmes attended, though they do it very differently, with FR asking for the *last* grade attended, and NL asking for up to seven educational programmes attended since lower secondary education. Sometimes countries also use pretty 'generic' questions without reference to either certificates, completion, achievement or attendance.[73]

69 This was concluded when the questionnaire item mentions diplomas, certificates, degrees, graduation or synonyms of these; or when the interviewer instructions specifically mention that only levels completed *with some kind of certificate* are meant. In the different questionnaires, the terms *Bildungsabschluss, Schulabschluss, Ausbildungsabschluss* (AT, DE), *diplôme, certificat* (BE, FR), степен (BG), τίτλος (CY, GR), *titolo di studio* (IT), *prófgráðu* (IS), *akte, graad, getuigschrift, diploma, examen, academische kwalificatie* (NL), *şcoală pe care aţi absolvit-o*, which means 'school you graduated from' (RO) and *qualification, passed examination* (the UK) were found. In the case of the item for LT in the EU-LFS, it could not be established firmly if *aukščiausią išsilavinimą* would refer to 'completed education' or 'completed degree'.

70 In the different questionnaire items, this is *abgeschlossene Schul-/Ausbildung* (AT, German-speaking part of CH), *opleiding(sniveau) voltooid* (Flemish-speaking part of BE, NL), *niveau de formation terminé* (French-speaking parts of BE and CH), степен завършено образование (BG), *livello di formazione terminato* (Italian-speaking part of CH), επίπεδο μόρφωσης/εκπαίδευσης ολοκληρώσει (CY, GR), *(skole)uddannelse gennemført* (DK), *kõrgeim lõpetatud haridus, lõpetatud kutse-, ameti- või erialaharidus* (EE), *koulutusaste suorittanut* (Finnish-speaking part of FI), *utbildningsnivån slutfört*, (Swedish-speaking part of FI), *level of education completed* (IE), *lokið námi* (IS), *sekmīgi iegūtais/pabeigtais izglītības līmenis* (LV), *(allmenn)utdanning fullført* (NO), *poziomu ukończonego wykształcenia* (PL), *nível/grau de escolaridade completado/que completou* (PT), *avslutade utbildning* (SE), and *šola končali* (SI).

71 Here, the country examples are *erreichter Bildungsgrad* (AT), *nivel de formaciòn alcanzado, nivel de estudios obtenido* (ES), *haridustase omandatud* (EE, Estonian version of the questionnaire), *niveau d'études atteint, niveau éducatif obtenu* (FR, LU), *level of education or training attained, level of education achieved* (IE), *izglītības līmenis ieguvis* (LV, questionnaire in Latvian), уровень образования полученного (LV, questionnaire in Russian), *uzyskany poziom wykształcenia* (PL), and *stupeň vzdelania dosiahli, dosiahnuté vzdelanie* (SK).

72 In the questionnaires, this is *uddannelse taget* (DK), *classe suivie, année d'études suivie* (FR), *opleiding, cursus, leerweg, examen or academische kwalificatien gevolgd* (NL), уровень образования получили (RU; UA, questionnaire in Russian), рівень освіти отримали (UA, questionnaire in ukrainian).

73 This is the case in CZ (*Jaký je stupeň nejvyššího dosaženého vzdělání respondenta?* or *Jaké je Vaše nejvyšší dosažené školní vzdělání?*), the Russian version of the questionnaire for EE (Какой самый наивысший уровень Вашего образования), HU (*Mi a/Mi az Ön legmagasabb iskolai*

Looking at the three surveys separately (for a summary, see Table 5.2), the countries in the ESS employ the most varied questionnaire items: Certificates, 'level completed' and 'level achieved' are used by approximately the same number of countries. Three countries measure the highest/last educational programme or institution attended rather than successfully completed, and six countries use generic questionnaire items. The instructions for the national teams provided by NSD in fact do not specify a conceptual or operational definition of educational attainment apart from referring to the 'highest level of education' (see Section 4.1.1), which is as we see here operationalised in different ways in different countries. Chapter 2 of the ESS Questionnaire Development Report (Erikson and Jonsson, 2001, p. 17, p. 27) however clearly refers to educational attainment in terms of *formal educational qualifications*.

In the EU-LFS, 'education attended' is only measured *in addition* to educational certificates in FR and NL, but never replacing educational attainment defined as the highest level of education successfully completed. The results reported above are in line with Eurostat (2007c), according to which certificates are the first criterion for the successful completion of an educational programme in the national LFS for most countries. However, for four countries, it is reported that the certificate is not an absolute requirement for some programmes. For PL for example, data are on *programme completed*, without taking exam success at upper secondary education (*Matura*, the Polish 'university entrance qualification') into account (Mach and Kryszczuk, 2008). Three countries also use credit points. In EU-SILC, level attended

végzettsége?, IS (*Hvaða námi hefur þú lokið?*), NO (*Hva er din høyeste utdanning?*) and SE (*Vilken är din högsta utbildning?*), which are all variations of 'What is your/the/the respondent's (highest) (level of) (formal) education?'). Yet other generic questionnaire items are used in LT (*Pažymėkite aukščiausią išsilavinimą*—'Select the highest education'), PL (*Poziom wykształcenia*—'level of education'), SI ('Your level of education:'—a Slovenian version of the EU-LFS questionnaire is not available) and TR (*Eğitim durumunuz nedir?*—'What is your educational status?').

TABLE 5.2: Operationalisation of educational attainment across the three surveys, number of countries using each operationalisation

	ESS	EU-SILC	EU-LFS	All
Certificate held	7	12	15	34
Level completed	7	5	9	21
Level achieved	9	4	1	14
Level attended	3	0	0	3
Generic	6	2	1	9
Not identified	0	2	4	6

Note: Summary derived from Table C.4. To avoid double counting of countries using multi-item instruments, priority rules were used in the given order of the categories (e. g. countries measuring attendance *and* certificates are counted as using the certificate criterion).

does not occur at all. Therefore, the EUROSTAT surveys are more consistent in the questionnaire items that are employed in the country questionnaires than the ESS. They also in most cases use a more narrow operationalisation of 'educational attainment' referring to educational certificates, rather than more generic notions like 'level attained' or 'level completed'.

A point ignored so far is that the question wording and labels of response categories in fact have to be interpreted together, since it is not totally necessary that both refer to certificates, even if this would be the most consistent option. It is e. g. also possible to ask a rather generic question but then offer certificates in all response categories that refer to levels of education where certificate are awarded. Or alternatively, the question could clearly refer to certificates and the response categories to the educational programmes or institutions where these qualifications are awarded.

However, in the ESS, BE, DK, NL, NO and SK *neither* mention educational certificates or qualifications in the question *nor* in the response categories. BG, CY, DE, GR, IT, RO and the UK clearly refer to certificates in the question, but not all of them also in the response categories, which sometimes enumerate generic levels of education or educational institutions. In DE, IT, LU, TR and

the UK, the response categories are largely formal certificates. The rest of the countries do not mention certificates in the question and use a mix of educational programmes, institutions, generic levels of education and certificates in the response categories. In this latter case, certificates are often only mentioned for some tertiary education categories (mostly academic degrees), but not for the lower or upper secondary level (see Table D.1).

For EU-SILC and the EU-LFS, it looks a little bit better, which is probably due to the clearer measurement guidelines issued to country teams (see Section 4.1.2 on page 93 and Section 4.1.3 on page 96): They explicitly mention that formal qualifications should be the primary criterion for successful completion of an educational level, and 'full attendance' be used only for the completion of educational programmes that do not conclude with a formal certificate. The guidelines for the ESS do not cover the issue of how 'highest level of educational attainment' is supposed to be operationalised (see Section 4.1.1).

However, also in EU-SILC and the EU-LFS, certificates are mentioned predominantly only in the response categories at the higher education levels, but not for the end of lower or upper secondary education in those countries that do not exclusively use certificates.[74] LV neither refers to certificates in the question wording nor in the response categories. In IE, all response categories are certificates apart from the lowest (primary education), so that the lacking reference in the question does not really matter. When countries use an open question, it cannot be told which type of information is actually recorded, particularly if the question itself does not refer to certificates (ES, GR).

74 For reasons of space, the response categories for EU-SILC and EU-LFS are not included in the appendix, but available from a separate file.

There is one more way in which countries' data collection instruments differ, namely the consideration of drop-out, which only happens in the ESS: Some countries (e. g. FR, HU, IL, PL in 2002, RU, SE) provide response categories for uncertified education like 'incomplete higher qualification', 'not completed University' or 'dropouts from ...'. DE and FR additionally have categories for 'intermediate' examinations that do not yet constitute recognised qualifications, but certify the successful completion of a *first stage* of higher education (*Zwischenprüfung* and *Vordiplom* in the case of DE, and DEUG in the case of FR). These countries thus also do not exclusively focus on 'successfully completed' levels of education. Since the other countries do not include such categories, this leads to a further inconsistency across countries. It is not entirely clear with which 'proper' attainment category these drop-out categories should be merged, because information on educational careers is unavailable so that the highest level of education *successfully completed* is actually unknown for all respondents in these drop-out categories.

There are other differences between countries and surveys in the exact wording of the questionnaire items. In terms of the scope of 'education' when the question is not about educational certificates, whereas in most cases the question simply mentions 'education', there are variations mentioning 'schooling', 'courses', 'studies' 'education and training' or the like. Although in the large majority of cases, the respondent is asked to report on the 'highest' level of education or certificate, in a few cases this is either not specified (EU-LFS: PL, SI; EU-SILC: PL in 2005), or the question asks for the 'longest' education (DK in ESS round one) or the 'last' school/institution from which the respondent graduated (RO in the ESS and TR in the EU-LFS) or that the respondent completed (SI in the ESS). In countries with complex multi-item

instruments, the highest level has to be determined when the data are coded into specific educational attainment variables.

5.1.2.3 *Criteria for the identification of ISCED level 1*

For implementing a distinction between ISCED levels 0 and 1, it is actually necessary to drop the criterion of certification in all countries where no school leaving certificates are awarded at the end of primary education (which will be the majority of European countries nowadays). At first sight, it might look superfluous to distinguish between ISCED levels 0 and 1 in European countries today, where lower secondary education is near-universal. However, if sample sizes are large enough, it would be important to make the distinction because of the lower levels of education of specific population groups, especially the elderly for whom only primary education was compulsory, and first generation immigrants from countries with a lower educated population. Table 5.3 shows an overview over the criteria used for distinguishing between ISCED levels 0 and 1 in different countries in all three surveys.

In the EU-LFS, according to Eurostat (2007c), for low levels of education (less than ISCED level 2) length of schooling is an additional criterion in three countries that have a single institution spanning education at ISCED levels 1 and 2 (a closer look at the questionnaire items however identifies four such countries: CZ, DK, IS and SI). Other countries in the EU-LFS use completed primary education (BE, BG, EE, FR, IE, LT, LV, PT and TR) to differentiate between ISCED 0 and 1. AT, CH, DE, FI and the UK however do not differentiate below completed compulsory school. AT neither differentiates respondents with less than primary or only primary education, so that ISCED 2 forms the lowest category there. IT has the school leaving certificate *lizenza elementare* at the end of ISCED 1. For the countries not yet mentioned, the questionnaire

TABLE 5.3: Overview over the use of criteria for the identification of ISCED level 1

	ESS	EU-SILC	EU-LFS
No distinction between ISCED levels 0 and 1	AT, CH (rounds 1 & 2), CZ, DE, FR (younger cohorts), IS, PL, RU, SE (younger cohorts), SI, SK	AT, DE, SE, the UK	AT, CH, DE, FI, the UK
Certificate at the end of ISCED level 1	FR (old qualification), IL, IT, SE (old qualification)	IT	IT
Completed first stage of basic/primary education	BE, BG, CH (round 3), CY, EE, ES, GR, LU, LV, NL, NO, PT, RO, TR	BE, CY, EE, FR, GR, IE, LT, LU, PT, SK	BE, BG, EE, FR, IE, LT, LV, PT, TR
Completed respective number of grades	DK, ES, FI, HU, IE, UA, the UK	HU, IS, LV	CZ, DK, IS, SI
Not examined (response categories unavailable)	–	CZ, NL, SI, ES, DK, FI, NO	CY, HU, NL, PL, SK, NO, SE, ES, GR, LU

Source: Country questionnaires from the ESS 2002–2007 (available from NSD), EU-LFS 2005 (Eurostat, 2009) and EU-SILC 2004–2006 (provided by Eurostat with the EU-SILC data).

item or exact response categories could not be identified (CY, HU, NL, PL, SK) or register data (NO, SE) or an open question (ES, GR, LU) were used.

In EU-SILC, the following grouping emerges: No distinction below ISCED level 2 in the questionnaire items in AT, DE, PL, SE and the UK;[75] distinction using a duration criterion in HU, IS, LV (since 2006); completed primary education or the respective stage of basic education in BE, CY, EE, FR, GR, IE, LT, LU, PT and SK; and using a reference to a certificate awarded at the end of primary education again only in IT. Not identified response categories do not allow any examination of the instruments used for CZ, NL and SI; an open question in ES, and register data in DK, FI and NO also exclude those countries from closer inspection.

For the ESS, we find no distinction below ISCED level 2 in the questionnaire items in AT, CH (rounds one and two), DE, IL, IS, PL and RU, as well as for

75 PL uses a category for 'incomplete basic education' (*Podstawowe nieukończone*), but we do not know how many grades of basic education respondents completed and thus if these respondents should be assigned to ISCED level 0 or 1.

younger cohorts in FR and SE. The distinction is made using a duration criterion in DK, ES, FI, HU, IE, UA and the UK. Completed primary education or the respective stage of basic education is used in BE, BG, round three in CH, EE, ES, GR, LU, LV, NL, NO, PT, RO and TR. As in the EU-LFS and EU-SILC, reference to a certificate awarded at the end of primary education again only occurs in IT. In the case of ES, both duration as well as completion of primary education play a role, which is due to changes in the educational system: for older cohorts, there were separate primary education institutions, and for younger cohorts, the distinction is made with a duration criterion. In FR and SE, primary education is only distinguished for older cohorts who received their schooling at a time when there was not yet one integrated type of school spanning ISCED levels 1 and 2. Unlike the solution found in ES, no duration criterion is used for these younger cohorts in FR and SE.

Therefore, countries use different criteria for distinguishing ISCED levels 0 and 1 or do not distinguish between them at all, which leads to different usage of the two lowest ISCED categories in the data (see Sections 4.2.1 on page 101, 4.2.2 on page 117 and 4.2.3 on page 122 for evidence from the education distributions in the three surveys). The practice to just leave out the respective distinction is least compatible with what the other countries do and will be discussed again in the next section.

All this variation shows different links between the theoretical concept of 'educational attainment' and its measurement in different countries and surveys. The variation in the operationalisation of educational attainment clearly goes beyond what is implied by the differences in educational systems across countries, and further co-ordination and improved measurement guidelines could potentially reduce this variation in the future.

5.1.3 *Applicability of ISCED to country-specific measures*

This section examines issues related to lack of detail in measurement instruments. Can ISCED 97 actually be coded consistently across countries from data produced with the country-specific education variables (CSEVs)? With respect to the applicability of the rather detailed EU-LFS version of ISCED to the country-specific measure in the EU-LFS, there is detailed evidence for 15 countries from Schneider (2008c) in addition to the report by the EUROSTAT Working Group on Education and Training Statistics (ETS WG) (Eurostat, 2007c). Therefore, in this section, the country-specific instruments in the ESS are checked in detail with respect to the applicability of ISCED because the ESS has been shown to be more problematic in terms of the measurement of educational attainment than the EU-LFS and EU-SILC in the previous chapter.[76]

If CSEVs are not sufficiently differentiated, harmonisation can be problematic because the existing country-specific response categories may aggregate educational qualifications that are mapped to different ISCED levels or categories. Table D.2 in the appendix shows how the CSEVs in the ESS are mapped to ISCED (and other cross-national education variables to be used later). Column 'ISCED' indicates the ISCED categories that country-specific education categories are mapped to in the ISCED mappings (Eurostat, 2005; OECD, 1999; UNESCO/OECD World Education Indicators Programme, 2000). Whenever an entry for one country-specific education category notes different ISCED levels or categories (such as '3Av, 4C'), this means that a CSEV cannot be strictly harmonised unless the respective differentiation is dropped in *all*

76 The items in EU-SILC are not analysed for this and the next section. However, it can be assumed that the most common issues will be identified with the other two surveys already.

countries.[77] Eurostat (2007c) also reports relatively many issues in this regard: only seven countries do *not* report any problems. Lack of differentiation can also be regarded as a sign of low quality in terms of validity because it could mean that specific pertinent distinctions are not reflected in the country-specific measure of educational attainment. This is a highly problematic weakness in the coding structure of the CSEVs, since "when a code category combines two responses that are nonequivalent for the purposes of the analyst, consistent and systematic errors can arise" (Groves, 2004, p. 316).[78]

5.1.3.1 *Distinction between ISCED levels 0 and 1*

As already discussed in Section 5.1.2.3, in ten ESS countries (AT, CH in rounds 1 and 2, CZ, DE, FR, IS, PL, SE, SI, SK), the CSEV does not allow any distinctions below ISCED level 2.[79] CH changed the CSEV in such a way in round three that ISCED levels 0 and 1 can be distinguished.

In the EU-LFS, it is already obvious in the distribution of educational attainment in Table B.3 that a number of countries (BE before 2005, DE, FI, HU, IS, LT before 2004, SE and the UK) do not differentiate two categories below ISCED level 2, but only one. As already mentioned on page 164, AT does not even use *any* category below ISCED 2 in the EU-LFS, although it is implausible that everybody has actually achieved the lowest certificate or completed

77 As a consequence, EUROSTAT advises users of their data to use a highly collapsed version of ISCED, which summarises levels 0 to 2, 3 and 4, and 5 and 6. Actually in most countries covered in Schneider (2008c), a 'perfect' implementation of ISCED 97 is impossible because of restricting characteristics of the country-specific instruments, despite the fact that the instruments devised in the EU-LFS are usually more detailed than in the ESS (see Table C.4 and Section 5.1.2.1).

78 The empirical implications for cross-national comparability of using such a highly aggregated measure will thus be investigated in Chapter 7.

79 FR and SE have categories for ISCED level 1 that apply to old educational programmes. The problem in these two countries is thus the lack of differentiation only for the younger age cohorts.

compulsory schooling.[80] Curiously enough, Eurostat (2007c) does not report this issue, so it seems that the NSIs did not bring it up. However, no common solution emerges without co-ordination across survey organisers and without further instructing countries on how to deal with this.

The NSIs and ESS teams in these countries thus only distinguish between completed compulsory education or the lowest national certificate as ISCED 2 and less than compulsory education or no certificate as ISCED level 0 or 1. In those countries using ISCED 1 for all respondents with less than compulsory education (all relevant countries in the EU-LFS apart from the UK and all countries but DE in the ESS), ISCED level 1 includes people with less than primary education. In the other countries, ISCED level 0 includes people with completed primary education.[81] ISCED categories 0 and 1 are thus not comparable across countries.

This could partly be a consequence of the measures of educational attainment being focused on educational qualifications and certificates, since most countries nowadays do not award formal qualifications at the end of ISCED level 1 any more, and partly because a differentiation between ISCED 0 and ISCED 1 is not very meaningful in many European countries nowadays (see the small size of the ISCED 0 and 1 categories in most countries in Table B.3). However, in the ESS, most of the affected countries do not use certificates for the distinction between ISCED levels 1 and 2 either (AT, CH, CZ, PL, RU, SE, SI and SK) and instead use the mere *completion* of educational programmes at

80 Thereby AT rules out early school leaving by design, which is not helpful for drawing an empirical picture of educational attainment. The potentially underlying expectation that all people complete today's compulsory education might not hold for immigrants, who received their education abroad, or for older cohorts, for whom only primary education might have been compulsory.

81 The reason why in the ESS those countries not distinguishing ISCED 0 and 1 use category 0 rather than 1 for all respondents with less than ISCED level 2 is that many of them classify completed compulsory education as ISCED 1, probably because the ESS coding frame here contradicts the definition of the ISCED main levels (see Section 4.1.1). This is a common misclassification and will be discussed when systematically investigating misclassifications in the ESS in Section 5.2.3.

ISCED level 2 as a criterion. Also, ISCED 97 was developed for a wider range of countries, and it is important for comparability reasons that a common solution is found, either not differentiating between ISCED levels 0 and 1 for all countries, or introducing a distinction in the list of countries given above using completion of primary education as a criterion. It should also be noted that due to immigration from less developed countries, there might be enough people with low levels of education in a country that a separate category might make sense also in countries where the domestic educational system usually guarantees that people complete compulsory education. The distinction is also relevant in countries where education expanded later (e. g. PT), the elderly and when measuring *parental* education, since in most European countries only the younger generations have benefited from universal lower secondary education.

Country experts also report that the differentiation below ISCED level 2 is difficult in EE and ES because in these countries, the length of primary schooling has changed over time (Ortiz and Kucel, 2008; Saar, 2008). This is probably also the case in many other countries and will be picked up again in Section 5.2.1.1.

5.1.3.2 *Distinctions between ISCED 2 and 3 and within ISCED 3*

The distinction between ISCED levels 2 and 3 does not seem problematic in the ESS and EU-SILC because no attempt is made to differentiate 'full' upper secondary qualifications awarded after completion of long ISCED 3 programmes and short programmes that are not considered as full-fledged upper secondary education. Because of the more fine-grained version of ISCED used in the EU-LFS, a distinction between the attainment of short 3C programmes and long 3C programmes is made so that attainment of the

shorter programmes can be assigned to level 2 in the more aggregated ISCED versions. This is probably one of the main reasons for the inconsistencies found between EU-LFS and EU-SILC data in Section 4.3.

According to Eurostat (2007c), 14 EU member states and Australia apply a limit of two years duration as a cut-off between 3C short and long, whereas three EU member states and Korea use three years. A further five EU member states and Japan use the length of 3A programmes as a yardstick: 3C programmes that are at least one year shorter are classified as 3Cs, and programmes that have an approximately equal duration are classified as 3Cl. A number of other countries do not have any 3C programmes (this includes DE, FI, Canada and the US, Eurostat, 2007c).

The occasional usage of the generic categories for ISCED level 3 (without distinction between A/B and Cl) and ISCED levels 3 and 4 (without further distinction) in Table B.3 shows that NSIs in some countries did not fully implement the detailed ISCED categories determined for use in the EU-LFS. According to Eurostat (2007c), ten EU member states report problems with the distinctions between ISCED categories 3A, 3B and 3C. Looking at Table B.3, we can identify CZ (until the third quarter in 2004), IE (until the second quarter in 2004), PT, SE and NO as an EFTA country using the generic category 3 for all or some responses at the upper secondary level. The other six EU member states reporting problems seem to report the data split up into sub-categories, but probably not in an entirely ISCED-compliant way.

5.1.3.3 *Distinction within and between ISCED 3 and 4*

The distinction between ISCED levels 3 and 4 is a subtle one: The qualifications awarded at the end of level 3A and 4A programmes are often the same

because level 4 caters for 'second cycle' or 'second chance' upper secondary programmes. According to ISCED logic, whenever somebody completes one general and one (long) vocational programme (in either order) at the upper secondary level, this should be classified as level 4 since the 'cumulative' amount of education received differs compared to individuals who only completed either general or vocational upper secondary education.[82] One situation is that somebody who has completed ISCED 3B or 3C gains a university entrance qualification in a kind of bridging programme leading to a qualification equivalent to the one usually achieved upon successful completion of ISCED 3A. Since this is rare as a final level of attainment because people would only do it in order to move on to tertiary education, most countries do not collect this information (CH in ESS round three and SK are the exceptions). The other situation is that somebody with a general university entrance qualification (3Ag) subsequently follows an upper secondary vocational programme that would itself be classified as 3B or 3C. This is then also classified as ISCED 4. This is sometimes covered in those countries where this is common, e. g. CH (from round three), DE (where the order of attainment is unclear though), EE, ES, but not in RU and UA.

Many country-specific measures do not allow tracing these second-cycle upper secondary qualifications since only highest qualifications are measured, but usually not the pathway or specific educational programme leading to these. The proper construction of ISCED level 4 in fact often requires some basic information on educational careers, usually not available in the CSEVs.

At least three countries cannot distinguish between ISCED levels 3 and 4 or specific categories within these in both ESS and EU-LFS. SI is the only country

82 Educational programmes that combine general and vocational education *in one programme* and thus are typically completed at the same age as the dominant 3A, 3B and 3Cl programmes are classified as ISCED 3Av.

in the EU-LFS where no differentiation is made at all so that categories 3AB, 3Cl, 4AB and 4C are reported in the generic levels 3/4 category and category 3Cs is reported with level 2 (Eurostat, 2008c, p. 85; also see Ivančič, 2008). Strangely enough, although only an English version of the questionnaire is published on the EU-LFS website, the data collection instrument seems to make most distinctions necessary for implementing a more detailed version of ISCED. However, the only distinctions that *can* be made is between 3A/4A and 3B/4B and 3C/4C (Ivančič, 2008). The Slovenian CSEV in the ESS also does not distinguish level 3 and 4 qualifications.

In FI, only ISCED 4C (*Erikoisammattitutkinto*; 'specialist vocational qualification') can be distinguished in the EU-LFS (see also Kilpi, 2008). In the ESS, this is included in the same category as general and vocational upper secondary qualifications in the instrument. 4C is a very small category though.

In DE respondents who followed a second vocational training programme at the upper secondary level (*berufliche Zweitausbildung*, ISCED 4B) cannot be differentiated from those who followed only one training cycle (3B). These cases will thus be found in ISCED level 3 rather than 4. Respondents who achieved their general higher education entrance qualification in adult education and did not complete vocational training before will also be misclassified as ISCED level 3A rather than 4A. The only level 4 qualifications that can be identified for DE is the combination of a general and vocational upper secondary education. In this case the ordering of the qualifications cannot be determined though, which would be necessary in order to tell if the highest qualification is 4Ag or 4Av. These observations are relevant to either survey, due to the way the German data collection instrument works, which is very similar in the ESS, EU-LFS and EU-SILC.

In the ESS, ISCED levels 3 and 4 also cannot be distinguished for BE, where one country-specific education category for technical upper secondary education spans ISCED 3Av, 4Av and 4C.

5.1.3.4 *Distinctions at ISCED levels 4, 5 and 6*

In 16 countries (AT, CY, CH rounds one and two, CZ, FR, GR round one, IE, IL, IS, IT, PL, SE rounds one and two, SI, SK, TR, UA), the CSEVs in the ESS do not have a separate category for ISCED level 6 qualifications, i. e. doctorates. In these countries, respondents with a PhD are thus found in the same country-specific category as other university graduates. One potential explanation for this is that ISCED level 6 was mistaken to relate to all postgraduate degrees, i. e. Master's degrees and upward, or (in the case of AT) even all academic degrees. In these countries, ISCED levels 5 and 6 cannot in fact be separated, and this country-specific category is usually coded as ISCED level 6 rather than 5. CH, GR and SE have changed their instruments between ESS rounds in order to allow this distinction (see Table D.1).

In the EU-LFS, this is much less common. In SI, due to the way data are collected nationally, Master's and doctoral degrees cannot be distinguished (see also Ivančič, 2008). From Table B.2 it looks like they are all classified as ISCED level 6: SI has a larger ISCED 6 category than most other countries. In IS and in both AT and PL (before 2004), doctorates are included in ISCED 5A with other university degrees. For IS it is not entirely clear why ISCED 6 is not distinguished from ISCED 5 because the questionnaire does distinguish *Doktorspróf eða sambærilegt* from other university degrees.

For the EU-LFS, we otherwise only have summary evidence from Eurostat (2007c). It is reported that in five EU member states, ISCED level 4 and category 5B are indistinguishable. The distinction between ISCED 5B and 5A is

problematic in two countries. One of them seems to be NO, since category 5B is empty in Table B.3 despite the fact that university qualifications that take less than three years to achieve are classified as 5B in the ISCED mappings (Eurostat, 2005). In FI, the only *current* qualification at ISCED 5B (police academy qualification) cannot be distinguished from polytechnic degrees (ISCED 5A), but older 5B qualifications are still identified (Kilpi, 2008).

For the ESS, a close inspection of the CSEVs (see Table D.1) together with the ISCED mappings (Eurostat, 2005) allows the identification of some further issues in detail. With respect to AT in the ESS, in the second and third round of the ESS, one response category contains programmes belonging to level 4A (*Ausbildung nach Abschluss einer Höheren Schule*; 'apprenticeship after general upper secondary education'), 5B (*hochschulverwandte Lehranstalt (berufsbildende, pädagogische Akademie, Kolleg)*; 'non-university tertiary education at vocational and pedagogical academies and colleges offering technical and vocational education')[83] and 5Am (*Bakkalaureat*; 'Bachelor'). The Austrian CSEV thus cannot be correctly coded into the ISCED 97 main levels for either year.

One response category in DE in ESS rounds one and two is *Hochschule/Universität: Zwischenprüfung, Vordiplom, Bachelor* ('College/university: intermediate exam/diploma, Bachelor') and thus mixes up ISCED 5A intermediate certificates that are not actually full qualifications (see Section 5.1.2.2), and a first medium duration university degree. Since there are only few Bachelor graduates in DE due to the very recent introduction of this programme this is (yet) negligible though. From the third ESS round onwards, intermediate certificates and the Bachelor degree have separate response categories.

83 In Eurydice (2005), *Kollegs* are considered as ISCED level 4, in Eurostat (2005) and OECD (1999) they are however assigned to 5B.

The Irish ESS variable mixes all *certificates* (ISCED 4C and 5B, depending on the type of certificate) and *diplomas* (5B) in one category. The EU-LFS reports around 10 % in each of 4C and 5B, so that this is a relevant differentiation.

There are finally some applicability issues that do not fit into either of these broader categories. With respect to NL in the ESS, category 5, *Korte Middelbar Beroebsonderwijs* (KMBO), 'short vocational secondary education', and *Voorbereidend Hoger Beroepsonderwijs* (VHBO), 'preparation for higher vocational education', mixes up ISCED 2C (KMBO) and 4A (VHBO). Category 6 in the Dutch CSEV in the ESS, *Middelbar Beroebsonderwijs* (MBO) *beroepsopleidende leerweg* ('vocational secondary education') spans ISCED levels 2, 3 and 4 because there are four levels of MBO (see Luijkx and de Heus, 2008). The first is assigned to ISCED level 2, the second and third to ISCED 3C, and the fourth itself spans ISCED 3A (*middenkaderopleiding*; 'middle management training') and 4C (*specialistenopleiding*; 'specialist training'). For mapping the Dutch vocational qualifications to ISCED quite detailed information is thus required, which is not available in the ESS variable.

The ESS Documentation Report (Jowell and the Central Co-ordinating Team, 2008) indicates that the Cypriot education variable cannot be coded into ISCED partly because of the country-specific category 'other qualification'. However, many other countries also have such categories which are usually assigned a missing value. It does not seem likely that any country post-coded the verbatim information on 'other qualifications' provided by respondents.

In the case of ES, the assignment of the first and second cycle of vocational training has changed over the course of educational reforms that were implemented in the late 1990s (see Ortiz, 2008). However, neither the LFS nor ESS data differentiate between pre- and post-reform vocational qualifications,

so that ISCED cannot be applied in a consistent way.[84] The lack of separate categories for current and 'old' qualifications moreover leads to the problem that *empirical* equivalence e. g. in terms of labour market prospect or inequalities in access to post-secondary education cannot be tested. The use of age as a proxy for education cohort would be a possible but still unsatisfactory workaround.

To summarise, in many ESS countries, the CSEV cannot be reconciled with the ISCED mappings because the country-specific categories aggregate qualifications that span several ISCED levels or categories. A strict implementation of the ISCED is thus impossible in most countries. Therefore, despite the NSD's request (see Section 4.1.1), a number of countries did not collect sufficiently detailed information on educational attainment for coding even into the levels-only version of ISCED 97 in the ESS.

For the EU-LFS, for most countries is only less detailed evidence available, but generally, the broad issues are similar to the ones found in the ESS. The fact that the CSEVs employed in the EU-LFS are (sometimes much) more detailed than in the ESS however implies that there are fewer problems, especially with respect to the distinction of ISCED level 6.

5.1.4 *Coverage of different sectors of the educational system*

The final point to look at in terms of consistency of data collection instruments refers to differential coverage of educational programmes and sectors

84 Similar issues will probably exist in other countries. For ES, this came to light because the reforms took place when the ISCED mappings were designed. Therefore, the assignments for both 'new' and 'old' qualifications are included in the mappings. The problems that educational reforms pose with respect to the application of ISCED to CSEVs will be further discussed in Section 5.2.1.1.

of the educational system. If some qualification is not covered by the measurement instrument, respondents holding this qualification will most probably classify themselves at a lower level (i. e. the highest qualification they hold that is included in the response categories). This will drag the distribution downwards if the missing category is common. It will also increase the unobserved heterogeneity of national categories with respect to individuals' actual human capital.

Differential coverage is quite difficult to detect however because missing information (i. e. an educational qualification not represented in the measurement instrument) is always less easily identified than, say, existing, but *problematic* information (i. e. several qualifications spanning different ISCED levels aggregated in one response category). Also, the labels of response categories in the data collection instruments differ from the naming conventions in the ISCED mappings. Very often, the former are 'summary labels' that survey respondents are supposed to understand, whereas the mappings cover individual educational programmes and qualifications and use their formal names which might be different from the more 'colloquial' usage employed in questionnaires. Finally, the ISCED mappings might be themselves incomplete or inconsistent in their coverage across countries (Eurostat, 2006b, p. 9–10), despite the fact that the UNESCO-UIS/OECD/EUROSTAT (UOE) data collection manual (UNESCO-UIS, OECD and EUROSTAT, 2008a, chapter 2) contains detailed guidelines on coverage, which are also described in OECD (2004b). As a note of caution, the evidence presented here is therefore certainly incomplete.

Particular attention has to be paid with respect to specific segments of educational systems such as adult education, vocational education and special

education. Ideally, all countries would cover these in equal ways. The dominant understanding is that all formal qualifications should be covered, no matter in which segment of the educational system they were achieved. Education that does not lead to recognised qualifications is thus excluded, but if some education leads to a recognised qualification, it does not matter in which segment of the educational system it can be acquired. Actually in some countries it is possible to sit an exam to validate competences acquired through work experience without attending the respective course of study. In such cases, the mapping to ISCED is performed on the basis of the equivalence of the qualifications in question with those from the 'mainstream' education system. The ISCED mappings, which cover recognised programmes and qualifications, will thus be used as a guideline. Non-formal vocational training (i. e. not regulated by national authorities) will possibly be a borderline case to be decided by national teams to in- or exclude.

Eurostat (2007c) reports that most countries only include formal education in their definition of educational attainment in the EU-LFS, and the same will probably apply to EU-SILC. Especially register-based data only record administrative information collected through the regular education system. These data will exclude adult and continuing education if not regulated by some government ministry. Seven countries also include a number of *recognised* vocational qualifications gained in non-formal education. The NSIs also mention a number of other coverage-related problems in applying the ISCED in their data reported in Eurostat (2007c), among which the treatment of special secondary education, adult education and vocational programmes. One country e. g. reported issues with the identification of technical and vocational education and training (TVET) at ISCED levels 2 and 3. Unfortunately no more details are given in the EUROSTAT report.

With respect to the ESS, changes in data collection instruments upon close examination of Table D.1 can sometimes give a hint as to which programmes were not covered in some round(s) but are covered later. A side-by-side comparison of the ISCED mappings and data collection instruments was performed for every country in the ESS. The most common coverage problem is the lacking consideration for completed primary education (often not concluding with any formal certificate, see Sections 5.1.2.3 and 5.1.3.1) and doctoral degrees (see Section 5.1.3.4) in the data collection instruments. Both was already discussed in Section 5.1.3 because they affect the applicability of the ISCED to data produced with these instruments.

Moreover, there seem to be coverage problems in some countries in that specific types of qualifications are not included in the response categories. In the single countries, the following coverage issues could be diagnosed:

- In AT, the category *Ausbildung nach Abschluss einer Höheren Schule, Bakkalaureat, hochschulverwandte Lehranstalt (berufsbildende, pädagogische Akademie), Kolleg* ('apprenticeship after upper secondary education, Bachelor degree, non-university tertiary education at vocational and pedagogical academies and colleges offering technical and vocational education') is only used from ESS round two onwards. In the first round, Bachelor degrees were probably reported in the category for university degrees. The other qualifications (classified as ISCED 4A and 5B in the OECD mappings, but reported as level 4 in the ESS, see Section 5.2.3) were probably not reported at all so that respondents with these classifications selected the next lower category that applied. Because of the fact that AT only had one category for post-secondary education in round one of the ESS, NSD excluded the Austrian education data from the harmonised variable in that round (see Section 4.2.1).

- In CZ, *Nástavbové studium* ('follow-up courses') allowing vocational secondary education graduates without maturity to gain access to higher education are not covered, but they are covered in SK. According to labour force survey data reported in Straková (2008), these are 2.6 % of the population aged 25–64. These will be included in level 3 in the ESS, although they should be classified as ISCED level 4.

- In DE, *Beamtenausbildung (mittlerer Dienst)*, which is vocational training for future civil servants at the upper secondary level (3C, Statistsche Ämter des Bundes und der Länder, 2008), is not covered by the instrument. Respondents with this education either assigned themselves to other upper secondary vocational training or to the next lower level of general education they have completed.

- In FR, *Diplôme de la capacité en droit* and *diplôme d'accès aux études universitaires*, both post-secondary qualifications for gaining university access (4Ag), are not covered. The consequence is the same as for CZ.

- In GR, vocational training at the upper secondary level (Απολυτήριο τεχνολογικού επαγγελματικού εκπαιδευτηρίου; 'Leaving certificate of upper secondary vocational education', ISCED 3C) and post-secondary non-tertiary education (Δίπλωμα επαγγελματικής κατάρτισης; 'Diploma of professional training', ISCED 4C) are missing in the questionnaire item and also not included in the available response categories. The instrument thus seems to be biased towards general education. Whereas category 3C is small in the EU-LFS, increasing numbers of people gain ISCED 4C qualifications in GR (between 7 and 9 %, see Table B.3).

- HU changed the response categories in ESS round two in order to include two categories that were missing before: *érettségire épülő felsőfokra nem akkreditált szakképzés, középfokú technikum* (ISCED 4Av) and *felsőfokra*

akkreditált szakképzés, felsőfokú technikum (ISCED 5B), both post-secondary technical education of one and two years duration respectively. Individuals with these qualifications will have been classified in level 3 in ESS round one.[85]

- For IL, apprenticeships and industrial schools (ISCED 3C) are not covered. ISCED level 4 qualifications are also not included in the questionnaire item.

- In IT, a category for vocational post-secondary education (*specializzazione post-diploma*) was added in ESS round two. With 0.9 % it is very small though; the EU-LFS also shows only around 1.2 % of the cases at this level of education. Moreover, vocational training at the upper secondary level not leading to a *diploma di scuola media superiore* are not covered.

- The Polish instrument does not cover teacher training (awarded at *Kolegium nauczycielskie*, ISCED 5B). Cases will probably be reported with the next lower category, 4B. The respective qualification is however not reflected in the EU-LFS either because the national surveys cannot differentiate between ISCED 5A and 5B (see also Mach and Kryszczuk, 2008). ISCED 6 can only be distinguished since 2004 (see Section 5.1.3.4.

- With respect to PT, *Cursos de Especialização Tecnológica* ('post-secondary technological specialisation courses', ISCED 4Bv) are not covered. This category is however negligible in size (the EU-LFS reports 0.5 %) since this educational programme was only introduced in the late 1990s. In ESS round three, "*licenciatura*" (ISCED 5A) was added to the label for higher education. *Bacharel* (5B) however is not mentioned, but could have been added to the category *superior politécnico*.

85 Both qualifications are actually misclassified in rounds two and three; see Section 5.2.3.

- In SI, again vocational courses as well as post-secondary maturity programmes are not covered. Since this also is the case in the ISCED variable in the EU-LFS, it cannot be estimated how many people are 'downgraded' to level 3 because of this. Furthermore, the questionnaire item explicitly asks respondents to include part-time and adult education, which no other country does.

- The Slovakian data collection instrument does not cover any qualifications between *Nadstavbové štúdium* and the Bachelor degree, although the ISCED mappings mention a number of courses at ISCED levels 4A, 4C and 5B: *Pomaturitné kvalifikačné štúdium* (4Av, 'post-secondary qualification'); *doplňujúce pedagogické štúdium* (4C, 'supplementary pedagogical study'); *Pomaturitné špecializačné štúdium; konzervatórium and Stredná odborná škola and Vyššie odborné štúdium* ('post-secondary vocational and professional specialisation, conservatoires and higher professional studies', all 5B). Level 4 is however also not reported in the EU-LFS, and category 5B is small (<1 %). Moreover, ISCED 3C qualifications are not covered by the instrument used by SK in the ESS.

- For TR, qualifications acquired in the apprenticeship system, which is of a 'dual' type of mixed instruction in schools and at the workplace and range from candidate to Master crafts levels (Karakaşoğlu, 2007, p. 800) are not covered by the instrument.

- As already noted in Section 4.2.1, in the UK vocational qualifications were not covered in the questionnaire in the second round of the ESS at all, which was an accidental slip and corrected in round three.[86]

86 The ESS master questionnaire as well as the adopted post-pilot questionnaire in the Questionnaire Development Report (Erikson and Jonsson, 2001, p. 64) show the measure that the UK used in round two as a kind of 'placeholder' for the country-specific data collection instruments on educational attainment. Possibly, the British team forgot to replace this by the 'proper' measure that was used in round one. It is unclear why such an exceptionally bad measure—apart from missing vocational qualifications, it only has five categories—is used

ISCED levels 4 and 5B are therefore under-covered in a number of countries. Level 4 might also be under-reported in countries not mentioned here because this category is usually small and its identification is known to be difficult with many country-specific instruments (see Schneider and Kogan, 2008, p. 32–33).

Rather than non-formal education to be covered in some countries but not in others, we thus find that segments of the *formal* education systems—usually vocational and professional qualifications—tend to be missing in the data collection instruments. This is especially the case in countries where vocational education is less institutionalised, such as GR, the UK, PT and IT. However, some Central and Eastern European countries and AT could also improve in terms of the coverage of TVET. The path of general education from lower secondary to university education is well defined by the data collection instruments in all countries, apart from the rather marginal second-chance university entrance certificates.

To summarise the whole of Section 5.1, there are differences across surveys and countries in data sources, data collection modes and amount of proxy reporting. The consequences in terms of comparability this brings about are very difficult to judge. Furthermore, countries (and surveys) use different types of data collection instruments, which might lead to some degree of non-comparability especially if the concept of 'educational attainment' is operationalised in different ways. Also, the instruments in many countries (especially in the ESS) are not suitable for producing data that are detailed enough for implementing ISCED using all seven levels, or even the more detailed version of ISCED employed in the EU-LFS. Whereas the latter two issues

as a placeholder in the source questionnaire. It is quite possible that national teams regard such a placeholder as an 'example' to be followed. It would probably be better to show a more detailed (yet manageable) instrument, or none at all but refer to separate instructions.

are avoidable in principle by improving co-ordination across countries, data sources and collection modes are largely 'given'.

Now let's turn to the process of harmonising the information provided by the country-specific data collection instruments. As was already pointed out in Section 4.2, coding of CSEVs into ISCED often changed over survey rounds, which implies inconsistencies across countries.

5.2 CONSISTENCY OF HARMONISATION PROCEDURES

Section 5.1 examined the first steps of the data generation process, consisting of (at the most basic level) instrument design and data collection. This section discusses the next step in the generation of cross-national educational attainment variables using survey micro data: the recoding of CSEVs into a common underlying scheme, here ISCED 97 levels.

In the first subsection (5.2.1), issues related to the coding of qualifications that are not covered by a country's ISCED mappings are discussed. Two further subsections examine more specific aspects of the harmonisation in the EU-LFS (Section 5.2.2) and in the ESS (Section 5.2.3).

5.2.1 *Coding of qualifications not covered by the ISCED mappings*

The ISCED mappings (see Section 2.2.4 on page 39) play an important role in the harmonisation of educational qualifications in cross-national survey data. They provide the 'key' that determines which qualifications are deemed equivalent in terms of ISCED criteria across countries.

The content of the ISCED mappings is however restricted to educational programmes in force and qualifications awarded in the respective countries at

a specific point in time: the late 1990s for the initial OECD mappings included in OECD (1999), school year 2000/01 for the summary graphical mappings in OECD (2004b), and school year 2002/03 for the UOE mappings available on-line (Eurostat, 2005). The reason for this is that these mappings are designed in the framework of the UOE data collection that relies on administrative data on current enrolment and graduations (see UNESCO-UIS, OECD and EUROSTAT, 2008a,b,c), and produces aggregate cross-national indicators on education systems. Their usefulness for the measurement of educational attainment in micro data from surveys and registers is thus a positive side-effect rather than a 'design feature'.

For the measurement of educational attainment in survey data, this implies two problems: a country's mappings do not cover qualifications not awarded in the reference school/academic year of the mappings, which will be discussed in Section 5.2.1.1; and they do not cover foreign qualifications, which is the topic of Section 5.2.1.2.

5.2.1.1 *Educational reforms and comparability over time*

One of the problems with applying ISCED to national data most frequently mentioned by the chapter authors in Schneider (2008c) is related to educational reforms, which result in new qualifications being introduced, older qualifications being phased out, and remaining programmes changing entry requirements, durations, and possibly also programme contents and examination standards. The UNESCO and OECD documentation on ISCED is tacit on how to deal with changing qualifications generally because the classification was developed for describing current educational systems rather than the educational attainment of whole populations.

This means that for outdated qualifications, which are very common amongst 'older' cohorts, there are currently no official guidelines on how to code them into ISCED 97. In Section 4.2.1, it was found that in the case of DE, the unclear mapping of *Anlernzeit* leads to inconsistent classification decisions in different ESS rounds. This is a major problem for coding data covering the general population, as those responsible for the coding will have to apply the ISCED criteria to the categories of the CSEVs themselves, without any formal documentation to assist in the task. Outdated qualifications will then probably be coded in the same way as their higher level 'successor' qualifications, which would be highly problematic for cohort comparisons.

The issue will be even aggravated for the harmonisation of country-specific measures of the educational attainment of respondents' *parents*, which is an important social background variable covered in many cross-national surveys (e. g. OECD's PISA and the ESS, see also Buchmann, 2002): The historical frame of time to be covered by the measure increases by one generation backward.

To make things worse, in the national data, outdated qualifications are often found in one response category with the current qualifications they are considered to be equivalent to *by national standards*. However, 'old' and 'new' qualifications might not be equivalent according to *ISCED criteria*. For example, in many countries, nursing education was upgraded from upper secondary to tertiary education over the course of the last decades. The entry requirement for nursing education has changed from ISCED level 2 to level 3 and the cumulative *years of education* completed from around 12 to around 14 years. As a consequence, the educational attainment of individuals completing nursing education at different points in time substantially differs: Later

cohorts with nursing qualifications completed higher levels of general education before entering nursing training than earlier cohorts, and the upgrade of nursing education probably entailed an increasing level of complexity of the educational contents of nursing training programmes themselves. If 'old' and 'new' nursing qualifications are included in the same category in a CSEV, ISCED cannot be applied in a strict way because the country-specific response categories span ISCED levels (see Section 5.1.3).

The same applies to other qualifications that were substantially reformed, or qualifications that have ceased to exist. As a result, various cohorts of individuals are classified as holders of the 'same' educational qualification even though the cumulative duration and content of their studies may vary substantially, both in the CSEV as well as in ISCED. Both the lack of mappings for outdated qualifications as well as the aggregation of 'old' and 'new' qualifications in one country-specific response category in the case of changing standards might thus lead to a hidden upgrading of populations' educational attainment. If different countries chose different ways of dealing with outdated and upgraded qualifications, this will also lead to further inconsistencies and non-comparability across countries.

Indeed Eurostat (2007c) reports that in the EU-LFS, 15 EU member states classify outdated qualifications according to ISCED criteria, whereas eleven countries classify them according to *current* assignment of today's equivalent qualifications. This is flagged as an issue for further investigation.

A related problem is that the standards of specific educational qualifications tend to change over time even if the qualification itself formally remains the same. Over the course of educational expansion, it is quite possible that while more individuals attain higher levels of education, the skills and competences required to successfully complete these higher levels have

dropped.[87] Unless changing standards are accompanied by corresponding changes of the educational programme in terms of ISCED criteria (i. e. typical entry age, entry requirements etc., see Sections 2.2.4.2 on page 42 and 2.2.4.3 on page 46), there is no change in the assignment of such qualifications to ISCED categories over time, and the change remains hidden.

As a country example, it is widely recognised by sociologists in the UK that standards for educational certificates typically awarded around age 16 and giving access to upper secondary general education have decreased over the last century whenever the respective examinations were reformed: The *School Certificate*, which required passes in five specified core subjects, was more demanding than the *General Certificate of Education, Ordinary Level*s (GCE O-Levels), replacing the former in 1951, and GCE O-Levels, abolished in 1988, were more difficult than the current GCSEs (for more details on these qualifications, see Schneider, 2008a). Although the level of competence associated with these qualifications most likely differs, they are all classified in the same ISCED category.

This is due to the use of auxiliary criteria as proxies for educational content, which are necessarily imperfect. A classification of educational programmes like ISCED is not capable of directly capturing human capital in terms of skills and competences connected with the attainment of specific education levels, let alone changes over time or cross-national differences therein. For example, there may be changes in the emphasis of teaching analytical thinking, basic numeracy and literacy, learning facts and 'soft skills' that cannot be reflected in an abstract classification like ISCED. The relationship between skills and competences on the one hand and educational attainment on the other

87 This is however difficult to prove empirically, and thus often remains a matter of political debate: Have standards really dropped, or are pupils and students nowadays better prepared to meet the examinations' requirements because of improved educational provision over time?

is an indirect one: The successful acquisition of skills and competences is validated in exams (or functionally equivalent procedures), and educational qualifications awarded upon satisfactory performance in exams certify the acquisition of those skills and competences. Changing standards in terms of competence requirements can be best detected using standardised assessment tests. However, the availability and comparability of such tests over time and space are problematic, too (with respect to the IALS, see e. g. Blum et al., 2001; Hamilton and Barton, 2000).

Cross-nationally, the Programme for International Student Achievement (PISA) studies have hugely advanced research into different educational standards across countries, and have generally found that there is quite a lot of variation in the skill levels of 15 year olds (students towards the end of ISCED level 2) across OECD countries (see OECD, 2001, 2004a, 2007). OECD's upcoming Programme for the International Assessment of Adult Competencies (PIAAC), anticipated to go into the field in 2011, can be expected to shed more light on the relationship between adult skills and educational attainment across cohorts in a wide range of countries.

What this tells us is that we need to be very cautious when interpreting cross-national educational attainment data. They are not suitable for strictly comparing levels of human capital in terms of skills and competences across countries. However, within countries, there should be a rather close relationship between skill levels and educational attainment since formal qualifications are awarded by competent bodies on the basis of performance in (more or less) standardised assessments. Since hardly any data contain both measures of skills and qualifications, this is an under-researched area.

5.2.1.2 *Classification of foreign qualifications*

In no country, the instrument for measuring educational attainment in the ESS provides for foreign educational qualifications. Most European countries, however, have substantial first-generation immigrant populations today (see e. g. Castles and Miller, 1993; Stalker, 2002), and increasing student mobility (e. g. Gordon and Jallade, 1996; Tremblay and Consultant, 2002) means that a small but increasing share of a country's indigenous population holds foreign educational credentials. For the large majority of countries, it is unclear how they code foreign educational qualifications.

The most probable options are that 1. foreign qualifications are assigned to a residual category like 'foreign qualification' or 'other qualification' and maybe additionally recorded verbatim (which would most probably lead to a missing value on the CSEV); or 2. they are assigned to an equivalent or the most similar national qualification during the interview. In the latter case it is unclear who would make this judgement: the respondent, the interviewer or both? In the (probably very rare) case that verbatim information is post-coded, does the coder take this decision? On the basis of what information about foreign qualifications?

In countries with a large immigrant proportion like CH or LU, the procedure chosen can make a real difference. In the case of LU, which did not have a university until 2003, everybody who wanted to earn an academic degree had to study abroad before. The categories for measuring higher education in LU are thus generic levels based on the duration of studies in years after achievement of the *baccalauréat*, reaching from *enseignement supérieur,*

BAC +2 to *enseignement supérieur, BAC +5 or more*.[88] At lower levels of education, there is no provision for foreign qualifications though. Also in the UK, foreign qualifications are probably one of the reasons why approximately 8 % of the population are classified as having 'other qualifications' (see Schneider, 2008a and Section 4.1.2): The Office of National Statistics (ONS) asks interviewers explicitly not to assign foreign qualifications to the UK's closest equivalents, but to code them in a generic residual category (Office for National Statistics, 2005, p. 19-10).

5.2.2 *Harmonisation issues in the EU-LFS*

This section reports on issues related to the harmonisation of education data in the EU-LFS.[89] The issues already mentioned in Section 5.1.3 about the applicability of ISCED to the CSEVs, which often implied that the actual coding of the data deviates from the ISCED mappings, will not be repeated here. More specifically, in this section it will be checked if the distributions of educational attainment as measured by ISCED in the EU-LFS corresponds to those reconstructed by country experts (the authors of the country chapters in Schneider 2008c) from high-quality national data sources. Thereby it will be possible to identify if NSIs coded ISCED for the EU-LFS according to the ISCED mappings that they themselves designed. Given that this work relies on the contributions of the country experts, this task is performed for only 15 out of the 26 countries covered by the EU-LFS data used in other parts of this study.

88 This is not ideal because actual educational qualifications are not mentioned. An alternative which would have provided for that would be to chose categories like 'an academic degree after 3 years of study in higher education' etc.

89 This section is an amended and shortened part of Schneider and Kogan (2008).

TABLE 5.4: Comparison of ISCED distribution in the EU-LFS with ISCED distribution derived from national data

Country	Data source	<1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6
CZ	EU-LFS 2001, Q2	.	0.3	13.8	.	.	42.0	34.3	.	.	.	.	0.6	8.8	0.2
	Census 2001	0.4	0.2	13.5	.	.	43.2	27.3	.	.	2.6	.	1.1	11.2	0.4
DE	EU-LFS 2004, Q2	.	2.1	14.2	.	.	.	54.6	.	.	6.0	.	9.7	11.9	1.4
	Mikrozensus 2004	>	2.1	14.2	.	.	.	53.1	.	.	5.6	.	10.3	13.1	1.6
EE	EU-LFS 2004, Q2	0.6	1.4	13.4	7.0	.	0.8	43.0	.	.	8.1	.	10.4	15.1	0.2
	LFS 2004	0.4	0.9	12.7	8.6	.	.	41.8	.	.	7.9	.	11.7	15.7	0.3
ES	EU-LFS 2004, Q2	1.3	25.8	27.9	0.5	.	0.0	20.0	.	.	.	0.1	7.2	17.0	0.3
	LFS 2004	1.4	27.3	26.5	0.4	.	6.1	12.2	.	.	0.3	.	7.1	18.5	0.4
FI	EU-LFS 2005, Q2	.	11.2	10.3	.	.	.	43.8	.	.	.	0.3	16.8	16.8	0.8
	Register 2005	>	23.6	<	.	.	.	.	42.2	.	.	.	15.5	17.7	0.9
FR	EU-LFS 2004, Q2	0.3	13.0	19.5	.	.	28.0	14.5	.	0.1	.	.	9.4	13.8	0.5
	LFS 2004	1.3	13.8	19.6	27.1	.	2.2	12.1	.	0.1	.	.	9.5	13.7	0.6
HU	EU-LFS 2004, Q2	.	2.6	25.6	.	.	29.5	28.2	.	.	1.6	.	0.2	12.1	0.2
	LFS 2004	>	2.1	22.6	.	.	28.8	28.1	.	.	1.7	.	0.2	16.3	0.3
IE	EU-LFS 2004, Q2	0.6	16.9	18.0	0.1	.	.	27.3	.	.	.	10.3	10.2	16.3	0.4
	QNHS 2004, Q1	0.6	17.7	18.6	0.1	24.3	.	.	.	.	.	10.5	10.5	17.4	0.4
IT	EU-LFS 2004, Q2	2.6	16.1	31.6	0.7	.	7.5	30.4	.	.	.	1.1	0.4	9.4	0.1
	LFS, 2004	2.7	16.0	32.4	.	.	7.6	28.7	.	.	.	1.2	0.4	10.9	0.1
NL	EU-LFS 2004, Q2	0.7	6.3	21.8	.	0.0	16.2	23.3	.	0.0	0.0	3.8	2.6	24.8	0.4
	EBB 2004	>	8.1	22.0	.	.	.	.	40.4	.	.	.	>	28.5	<
PL	EU-LFS 2002, Q2	.	0.5	20.0	33.6	.	.	32.5	.	3.4	.	.	.	10.1	.
	Census 2002	>	0.5	17.9	34.3	.	.	30.1	.	.	.	4.4	>	12.4	0.4
SE	EU-LFS 2004, Q2	.	6.4	10.3	.	50.4	.	.	.	.	.	6.9	8.6	16.6	0.9
	LFS 2004	>	7.3	11.0	31.7	.	.	17.3	.	.	.	6.1	8.5	17.2	0.9
SI*	EU-LFS 2004, Q2	0.4	2.4	17.7	.	.	.	.	63.2	.	.	.	8.4	7.0	1.0
	LFS 2004	0.4	2.7	17.4	.	.	.	.	60.6	.	.	.	9.2	8.6	1.2
UK	EU-LFS 2005, Q2	0.2	.	15.0	14.1	8.3	18.4	14.8	.	.	0.1	.	9.0	19.2	0.9
	LFS 2004/05	0.3	0.3	19.2	16.7	.	17.8	14.9	.	.	0.1	.	10.0	19.9	0.9

Notes: Respondents aged 25 to 64. Unweighted data. * =ISCED level 6 includes postgraduate specialisation and Master's degrees.
< / >= Value in the cell to the left/right covers both categories.

Table 5.4 reports the distribution of ISCED coded in the detailed EU-LFS version for 15 European countries. Again, the samples were restricted to respondents aged 25 and 64. For each country, the first row shows the distribution of ISCED 97 as found in the EU-LFS, usually from the second quarter of 2004. The second row shows the distribution achieved through the recoding of CSEVs in a national labour force survey or census performed by the country experts according to the ISCED mappings.[90] If the best national data source that the expert had access to is not from 2004, the closest available year was chosen for the EU-LFS.

Most of the countries that do not distinguish two categories below ISCED level 2 in the EU-LFS (see Section 5.1.3.1) code all respondents with less than ISCED 2 as ISCED 1. In the UK however, ISCED 1 is not used, so that everybody with less than ISCED 2 is coded as ISCED 0. So not only do countries use different criteria for differentiating educational attainment below level 2 (see Section 5.1.2.3), but they also code ISCED differently into the two available categories, ISCED level 0 and 1.

In CZ, there is a much higher proportion of individuals at ISCED level 3AB (7 percentage points difference) and a somewhat lower proportion of individuals at levels 5A (2.4 percentage points) to be found in the EU-LFS compared to census data. These differences are large enough to suspect a difference in the application of ISCED by the NSI and the country expert. Furthermore, Straková (2008) managed to identify two ISCED categories that are empty in the EU-LFS in 2001, namely ISCED 0/less than ISCED 1 (0.4 %) and ISCED 4Av (2.6 %). The latter is obviously included in ISCED 3AB in the EU-LFS data, and the expert mentions that this is common practice in CZ. However, the EU-LFS

90 In the country chapters in Schneider (2008c), some authors additionally show educational attainment distributions coded in ISCED using amended mappings of national qualifications to ISCED, not shown here.

identifies both ISCED levels 0 and 4 (without distinction between A, B and C) in the later years. It is unclear where the differences at ISCED levels 3AB and 5A result from, but as the reported distributions result from different data sources, differential population coverage and non-response error might explain this.

In the case of DE, the small differences that can be observed between the distribution of ISCED in the EU-LFS and ISCED derived from the Mikrozensus are probably due to different treatment of missing values. The data collection instrument consists of four items so that coding into one variable is not as straightforward as with instruments that only consist of one item. This could be standardised, but there are currently no guidelines on how to treat missing values in the German CSEVs when coding data into ISCED.

For EE, there are no large discrepancies. However, whereas the EU-LFS splits ISCED 3C into short and long, Saar (2008) classifies all vocational upper secondary education as shorter than 3 years. The ISCED mappings do not contain any ISCED 3C qualifications that take more than 2 years, but maybe the NSI coded some outdated qualifications not covered by the mappings as 3Cl.

In ES, ISCED level 3 was not coded according to the ISCED mappings in the EU-LFS: Category 3Cl is tiny in the EU-LFS compared to the national LFS, and category 3AB is much larger. ISCED level 3 altogether however is very similar, so it looks as if long 3C qualifications were classified as 3B (and thus coded ISCED 3AB) in the EU-LFS (also see Ortiz, 2008). As regards the Finnish data, Kilpi (2008) could not distinguish ISCED levels 0 to 2 on the one hand and 3Av and 4Cv on the other using published register data. The NSI has obviously access to more detailed data when delivering data to EUROSTAT.

In FR, Kieffer (2008) and the EU-LFS code ISCED level 3C differently. Whereas the country expert codes respondents with *Certificat d'aptitude professionelle* (CAP, 'Certificate of vocational capacity') and *Brevet d'études professionnelles* (BEP, 'Certificate of vocational training'), which both require two years of upper secondary vocational education, as 3Cs, they are 3Cl in the EU-LFS. Kieffer (2008) reserves 3Cl for the *Brevet professionnel* (BP, 'Master crafts certificate') and *Brevet de technicien* (BT, 'Technician's certificate'), which take longer to complete and come closer to the *baccalauréat technologique* ('Technological baccalaureate').[91] Before 2003, CAP, BEP, BP and BT were all classified as 3Cs in the EU-LFS.

In HU, there is a higher proportion of individuals at ISCED level 2 (2.8 percentage points) and a lower proportion of individuals at levels 5A (4.2 percentage points) reported in the EU-LFS compared to the Hungarian LFS. The reasons remain unclear, and the fact that the 'neighbouring' categories are of similar sizes and that the data in both rows are in the end derived from the same data source makes this result rather puzzling.

With respect to IE, the sub-dimensions within ISCED level 3 (apart from the marginal 3Cs, which represents the *Transition Year* and does not count as ISCED level 3 completion) cannot be implemented. The EU-LFS considers all upper secondary qualifications as 3AB, whereas Smyth (2008a) prefers to code them into the generic level 3 category since they contain the *Leaving Certificate Applied*, which is classified as 3C in the ISCED mappings and takes two years. The Quarterly National Household Survey (QNHS), which is Ireland's data source for the EU-LFS, does not differentiate between 3A and 3C qualifications (see Section 5.1.3.3).

91 Since the BP actually requires CAP for entry, BP should be classified as 4C rather than 3C in the ISCED mappings (Kieffer, 2008, p. 118).

In IT, the EU-LFS identifies 3Cs qualifications, whereas Barone and Schizzerotto (2008) don't. This is a minor category though that the country experts probably included in ISCED level 2. As was found in Section 4.2.3.2, the treatment of 3Cs has changed a couple of times in the EU-LFS, too.

In NL, as the categories published in the *Enquête Beroepsbevolking* (EBB), which is the Dutch LFS, partly do not overlap with ISCED, the EU-LFS sub-categories cannot be reproduced at ISCED levels 3, 4, 5 and 6, despite the fact that the EU-LFS is based on the EBB. Like in FI, Luijkx and de Heus (2008) did not have access to more detailed data.

With respect to the Polish data, whereas the EU-LFS classifies all ISCED 4 qualifications in the generic category, Mach and Kryszczuk (2008) assign these cases to ISCED 4C. There are in fact no other qualifications at level 4 in PL than those, so that the coding by the country experts can be regarded as more specific. From 2003 onwards, the EU-LFS data actually also code all level 4 qualifications as 4C.

For SE, whereas the EU-LFS does not distinguish programme destination at ISCED level 3, this is possible with the national LFS. This is hard to understand, since both distributions are derived from the same register data. In SI, as already mentioned in Section 5.1.3.3, the issue lies mainly in the lack of differentiation of the CSEV. At the low level of differentiation that is possible to code, no misclassifications occur.

The British data in the EU-LFS use the generic category 3 for a substantial number of cases (8.3 %). From a close inspection of the ISCED mappings, this should not be necessary and is documented neither in the EUROSTAT nor OECD mappings for the UK. In fact, these 8.3 % are 'other' qualifications that are assigned to ISCED level 3, instead of being coded as missing. This is also why most other categories are slightly larger in the derived distribution, for

which 'other' qualifications were coded as missing, which lowered the base number of cases substantially. In contrast to the EU-LFS, ISCED 1 could be identified using the national data because respondents are asked for their school-leaving age. This information is not used by the ONS for deriving ISCED for the EU-LFS.

To summarise, the implementation of ISCED 97 in the EU-LFS is quite satisfactory overall and the EU-LFS distributions of ISCED 97 can largely be approximately reproduced from other data sets. However, there are exceptions where there are substantial discrepancies between the EU-LFS and the reproduced distributions. These problems are usually rather specific to single countries. In some countries, it was impossible to reproduce ISCED 97 as used in the EU-LFS from national data, e. g. in NL and FI, because the national data the country experts had access to were not differentiated enough. In CZ, FR, SE, SI and the UK, it was possible to implement ISCED 97 in more detail than achieved in the EU-LFS. In FR and ES, the distributions diverge because some national categories were classified differently by the EU-LFS and the country experts (and the latter followed the ISCED mappings).

5.2.3 *Recoding of national variables in the ESS*

Now let's turn to the evaluation of harmonisation procedures in the ESS. As shown in Section 4.1.1, more and more documentation about ISCED 97 became available to national teams in the ESS over the years, with the mappings of national categories to ISCED 97 unfortunately only from round three onwards. The quality of CSEVs was also emphasised more strongly over the single rounds. It can thus be expected that the implementation of ISCED 97 in the ESS improved from round one to round two, and again in round three.

Generally speaking, quite some effort was made centrally to ensure adequate coding practice. It is unclear, however, how much effort and understanding the national teams in the different countries put into the recoding of the CSEVs into the harmonised ISCED variable, e. g. in terms of using the documentation on ISCED 97 provided, and thus if they applied consistent decision rules (which is problematic whenever national teams apply an international classification to the national data, Kerckhoff and Dylan, 1999). Therefore, this section will more closely look into how the recoding was actually done, thereby expanding on the results reported in Section 3.1.1.

We have seen in Section 4.2.1 that many changes in the distribution of educational attainment within countries over ESS rounds could be explained by the fact that either data collection instruments or ISCED assignments were changed. Some misclassifications in specific ESS rounds thereby could already be diagnosed, such as the common error of classifying long or non-doctoral postgraduate degrees in ISCED level 6 rather than 5. However, it is still possible that there are more deviations in the harmonisation of educational attainment from the ISCED definitions threatening cross-national comparability, namely when a country *consistently* misclassifies some educational qualifications in all three rounds. In Section 4.3 it was found that the ESS deviates substantially from the EU-LFS and EU-SILC in quite a number of countries. Over and above differences across surveys in sampling and non-response error, this could be explained by the fact that national teams recoding CSEVs into ISCED in the ESS did not code according to the ISCED mappings.

In this section, the compliance of ISCED-variable *edulvl* in the ESS with the criteria set out by the UNESCO (1999, 2006 [1997]) and the ISCED mappings is checked so as to more systematically and thoroughly evaluate how the CSEVs were harmonised in the ESS. In order to do this, cross-tabulations

of the CSEVs (*edlvxx*) by the cross-national variable *edulvl* were analysed in detail. These cross-tabulations clarify how exactly CSEVs were translated into ISCED 97 in the ESS countries. Since the CSEVs are not included in the EU-LFS and EU-SILC, such detailed analyses can only be performed for the ESS.

When examining the cross-tables of *edulvl* and *edlvxx*, it turned out that in many instances, the national teams did not follow the definitions established by the UNESCO (2006 [1997]) and the recommendations given in the OECD (1999) manual on the implementation of ISCED 97. The issues in BE, IL and SE identified by Kolsrud and Skjåk (2005, see Section 3.1.1) are thus only the tip of the iceberg. Appendix D.2 shows how ISCED is coded from the CSEVs in all ESS countries (column *edulvl*), and which ISCED level or category the ISCED mappings assign to the country-specific categories (column 'ISCED'). The most common classification errors and problems are summarised in the following paragraphs.

5.2.3.1 *Misclassifications at ISCED levels 0, 1 and 2*

Firstly, ISCED levels 0 and 1 are coded inconsistently: In the countries mentioned above that do not differentiate below ISCED level 2 in their CSEVs (see Section 5.1.3.1), either ISCED level 0 or 1 is not used, introducing inconsistent ISCED coding across countries. AT, CH, CZ, FR, IL, IS, PL, SE, SI and SK in round two use ISCED level 0, whereas DE and SK in round three use level 1. This is similar to what happened in the EU-LFS.

In AT, IL, IS, PL, SI and SE, this misclassification between levels 0 and 1 is connected with another classification error, namely that the end of lower secondary education in these countries is coded as ISCED level 1 rather than 2.[92]

92 The documentation for AT actually states level 2 as being the ISCED equivalent of *Pflichtschule* ('compulsory school'), but in the text label next to the value as well as what is actually coded in the data refer to ISCED level 1.

This error also occurs in some other countries which have basic education rather than separate primary and lower secondary schools, namely in ES in rounds two and three (where *certificado de escolaridad* (2A) is mapped to ISCED level 1) and in HU.

Without good knowledge of the ISCED 97 criteria for levels 1 and 2, it is quite probable that primary education in the national and international terminology get mixed up in those countries where the terms do not mean the same. In a number of countries, ISCED levels 1 and 2 *combined* are referred to as primary education: for example, what is locally 'primary' education in SI is 'basic education' (a single structure comprising primary and lower secondary education) in the international ISCED terminology.

It was already speculated in Sections 4.1.1 on page 90 and 5.1.3.1 on page 168 that the ESS organisers have possibly misunderstood the definitions of ISCED levels 1 and 2 themselves, interpreting level 1 as 'basic' rather than 'primary' education, since the label for category 0 of the ESS coding frame is 'Not completed primary (compulsory) education'. The inclusion of 'compulsory' in this label contradicts the definition of the ISCED main levels (see Section 2.2.4.2), where 'compulsory education' is not used as a main criterion to form a level of education because the length of compulsory education varies too much across countries and over time. It is only a subsidiary criterion for identifying the end of ISCED level 2. In some countries, education is actually compulsory until the end of ISCED level 3. The erroneous ESS label seems to imply that level 1 is the category for 'primary (compulsory)' education, which is very confusing for those countries where primary education is substantially shorter than compulsory education.

5.2.3.2 *Misclassifications at ISCED levels 4 and 5*

In the ESS, qualifications at level 5B (e. g. master craftsmen, higher technicians, nursing and in some countries teacher qualifications) were falsely assigned to level 4 in a rather large number of countries (namely AT, CH, CZ, DK, ES, GR, HU in round two, IE, IL, IT, SI, RU and the UK). One explanation for this is that national teams wanted to distinguish these qualifications from academic higher education (ISCED 5A), as the ESS coding scheme does not provide for a distinction between ISCED 5A and 5B. An alternative explanation is that they had ISCED 78 rather than ISCED 97 in mind when doing the reclassifications, where level 4 in fact referred to sub-degree level tertiary qualifications.

5.2.3.3 *Misclassifications at ISCED levels 5 and 6*

As described in Section 5.1.3.4, many countries include ISCED 5A qualifications in ISCED level 6 in the harmonised variable in the ESS (these were AT, CY, CH rounds one and two, CZ, FR, GR round one, IE, IL, IS, IT, PL, SE rounds one and two, SI, SK, TR, and UA). Their CSEVs do not allow a distinction between levels 5 and 6. However, even in those countries that differentiated PhDs in their CSEV, some of them misclassified post-graduate ISCED 5 qualifications as ISCED 6. These are BE (in rounds one and two), EE, HU, NO and RU. Again, there are two potential explanations: either national teams wanted to differentiate between undergraduate/lower level tertiary and postgraduate/higher level tertiary degrees, or again ISCED 78 interfered, where level 7 in fact referred to all post-graduate degrees.

In GR, what is actually recoded from the CSEV into ISCED level 6 in round two is the 'don't know' category. Nobody in the sample actually completed

a PhD; this category is empty in the CSEV (see Table D.1). It is unclear how PhDs were distinguished in GR in the first round of the survey: there is no specific response category for them in the CSEV; still respondents with a post-graduate degree (μεταπτυχιακό δίπλωμα) are split across ISCED levels 5 and 6. It looks as if some supplementary information that is not available to ESS data users was employed for deriving ISCED.

5.2.3.4 *Accumulation of misclassifications in single countries*

There are a few countries in the ESS in which several misclassifications 'accumulate'. In these countries, the cross-national education variable *edulvl* is very different from the intended target classification, ISCED, and comparability thus most questionable. These are AT, FR and SI.

With respect to AT, none of the categories in *edulvl* is coded exactly right (see Table D.2, pages 416). What is coded as level 0 is a mix of ISCED 0 and 1; what is coded as level 1 is clearly ISCED 2A (see Section 5.2.3.1); AT coded vocational upper secondary qualifications (ISCED 3C and 3B) at level 2 of *edulvl* and only general upper secondary qualifications (ISCED 3A and 4A) at level 3. What is coded as level 4 is a mix of ISCED 4A, 5B and 5Am (see Section 5.1.3.4), and what is coded as level 5 in round two and level 6 in round three is a mix of ISCED 5Al and 6 (see Section 5.2.3.3). Therefore, whereas *edulvl* might well reflect the *ordering* of the Austrian country-specific education categories, the content is not comparable with *edulvl* in other countries.

In FR, the mapping of ISCED to the CSEV diverges substantially from the ISCED mappings (see Table D.2, pages 435) at levels 2, 3 and 4. Upper secondary TVET (*CAP*, *BEP* and equivalent, 3C) is assigned to level 2, whereas general lower secondary education (*Brevet des collèges*, 2A) is classified as ISCED 3.

The *Baccalauréat* and equivalent qualifications are assigned to level 4 rather than 3.

Finally, SI reports that "there is direct correspondence between the national categories and the ESS education standard. ISCED 97 was used in the questionnaire" (Jowell and the Central Co-ordinating Team, 2003, Documentation Report, p. 147). This is not an entirely adequate description, since of course country-specific education categories were used in the instrument (see Table D.1, page 412). These are transformed to *edulvl* by simply subtracting 1, so in this respect, there is direct correspondence. However, the resulting bridging from the CSEV to *edulvl* does not conform with the ISCED mappings for several categories: The mismatches between ISCED levels 0, 1 and 2 (Section 5.2.3.1) as well as 5 and 6 (Section 5.2.3.3) were already mentioned. Furthermore, ISCED level 3C qualifications are assigned to *edulvl* category 2 and ISCED level 5B qualifications to *edulvl* category 4.

5.3 CONCLUSIONS ON THE CONSISTENCY OF CROSS-NATIONAL EDUCATIONAL ATTAINMENT DATA, AND ONWARDS

This chapter closely examined the generation of cross-nationally comparable education variables in survey micro data. The most important and consequential issues in terms of ease of harmonisation and comparability are the lacking degree of differentiation of CSEVs (Section 5.1.3), and inconsistent recoding of country-specific education categories into ISCED (Section 5.2), which was examined in detail for the ESS (Section 5.2.3). However, there are also some other factors impacting on cross-national comparability in less predictive ways, among which are subtle differences across countries in the question and response category wording (Section 5.1.2), data collection methods (Section 5.1.1) and differential coverage of specific segments of

educational systems (Section 5.1.4). Since some of the issues accumulate in some countries, there might be some underlying reasons for this, such as differences across national teams in their genuine interest in social background variables, as well as unequal expertise of national teams and data gathering institutions.

With respect to the harmonisation of CSEVs in the ESS, different classification decisions were taken with respect to similar educational programmes in different countries, leading to the situation that the supposedly comparable cross-national education variable *edulvl* is in fact *not comparable* across countries. The ISCED mappings are used as a criterion against which the coding in the ESS was evaluated, assuming that the ISCED mappings are the best available criterion for judging comparability. Even this can however be disputed in some cases.[93]

The next chapter of this study will evaluate the information content of harmonised education variables as compared to CSEVs, using ESS data. This requires that the cross-national education variable in the ESS is corrected, thus eliminating classification errors and inconsistencies over time that were found in this and the previous chapter.

In order to improve comparability, ISCED 0 and 1 are distinguished post-hoc using *years of education* as a proxy variable: respondents with less than 4, 5 or 6 *years of education* are assigned to ISCED 0, and those with more than 4, 5 or 6 but less than 8 *years of education* to ISCED 1, depending on the duration of primary education in the respective country, taken from OECD (1999) and Eurostat (2005). Completed basic education has to be re-coded to ISCED 2 in those countries that misclassified this as ISCED level 1, and incomplete basic

93 For suggestions on how to improve the ISCED mappings for a number of European countries, see the country chapters in Schneider (2008c).

education to level 0 or 1, depending on the *years of education* necessary to complete ISCED 1 (again derived from Eurostat, 2005; OECD, 1999).

ISCED levels 5 and 6 cannot be separated in any way in a large number of countries. These two levels thus need to be aggregated. If ISCED levels 3 and 4 are not clearly separable in the CSEV, this was ignored though and coded as level 3 since most probably only a marginal number of cases would have been in level 4. The resulting cross-national ISCED variable would be identical to the one implemented in EU-SILC (see Section 4.1.2). The Austrian, Irish and Ukrainian education variables cannot be even coded into this scheme though because their CSEVs contain categories that span ISCED levels 4 and 5. For these countries, ISCED cannot be evaluated further.

With respect to response categories reflecting incomplete levels of education (drop-out), these were re-coded downward, i. e. as ISCED level 2 for dropouts from level 3, and level 3 for dropouts from level 5. Arguably these latter cases could also be classified as ISCED level 4, but since most countries do not have dropout categories, it was decided otherwise for reasons of comparability. The variable thus reflects the (most probable) highest level of education *successfully completed* in all countries.

Misclassifications were corrected using the ISCED mappings as a guideline, even if in some cases there would have been good reasons to deviate from the official ISCED assignments. However, it was considered important to evaluate the 'official' ISCED as a cross-national measure of educational attainment in Chapters 6 and 7.

Table B.5 shows the distribution of the corrected cross-national education variable in the ESS. This time, also those countries that took only part in one of the three ESS rounds are shown. There are fewer significant differences over ESS rounds than in Table B.1, and the remaining ones are due to

changes in the data collection instruments and in the distribution of educational attainment on the CSEV, i. e. based on input, but not harmonisation. The harmonisation was made consistent across countries and ESS rounds (using the ISCED mappings) in the corrected variable.

Table 5.5 shows the dissimilarity indices comparing the corrected education variable in the ESS 1. with the ISCED variables in EU-SILC and EU-LFS, as in Table 4.8 in Section 4.3, and 2. across the three ESS rounds, as in Table 4.4 in Section 4.2.1. The differences between the ESS and the other two surveys decrease considerably when using the corrected *edulvl* variable as compared to the distributed data. The improvements are very substantial for BE round three, FR, HU, IS, PL rounds two and three, SE, SI and the UK. Only in some of the comparisons does the corrected variable in the ESS move away from the data in the EU-LFS (CZ 2002/03, DE, DK, GR 2004/05, LU in 2002/03 and 2004/05) and EU-SILC (DE, DK, EE 2006/07) compared to the original *edulvl* variable, but always by small amounts only ($\Delta D < 1.5$).

ES round two and three for both EU-SILC and EU-LFS and PL round one for the EU-LFS are the only exceptions. The deviation in PL is due to the fact that 'basic vocational' education (*Zasadnicze zawodowe*) is classified as 3Cs (and thus aggregated in ISCED level 2) in EU-LFS 2003 but 3Cl (and thus aggregated in ISCED level 3) in EU-LFS 2005, whereas it is consistently classified as ISCED 3 in the corrected education variable in the ESS. For ES it pretty much looks like there is a genuine problem in the data in the CSEV, possibly caused by non-response error or systematic coding errors during the interview, which also shows up in the comparison of the three ESS rounds.

Comparing the three ESS rounds, the very large index values for HU comparing rounds one and two and BE, NO and SE comparing rounds two and three have decreased substantially. For almost all other countries, D has

TABLE 5.5: Duncan's Dissimilarity Index for educational attainment distributions across ESS, EU-SILC and EU-LFS, corrected education variable in the ESS

Country	EU-LFS–ESS		EU-SILC–ESS		ESS–ESS	
	2002/03	2004/05	2004/05	2006/07	r1/r2	r2/r3
BE	12.7	11.4	8.5	10.3	2.8	2.0
CH	.	.	.	.	2.4	7.4
CZ	7.6	4.8	3.0	.	3.2	.
DE	9.3	10.6	9.8	12.3	3.4	7.1
DK	3.6	17.0	13.8	22.2	13.9	3.6
EE	.	5.0	4.8	9.8	.	6.8
ES	21.0	19.9	18.5	17.9	18.0	13.2
FI	7.2	7.7	12.9	14.1	6.5	2.7
FR	10.1	11.5	14.6	14.6	1.6	4.6
GR	14.4	10.1	10.5	.	4.4	.
HU	2.8	10.9	8.3	10.1	18.6	11.6
IS	.	16.6	16.5	.	.	.
IT	4.5	6.2	.	9.0	7.2	.
LU	22.6	13.5	4.2	.	7.0	.
NL	14.2	11.3	14.5	10.6	4.9	5.3
NO	4.1	20.1	11.8	19.9	22.7	5.2
PL	32.8	18.7	18.6	16.8	4.6	2.8
PT	5.5	3.8	3.9	2.4	3.6	2.9
SE	6.6	8.6	10.5	8.1	1.7	5.8
SI	3.7	4.0	23.9	19.7	4.4	5.0
SK	.	20.5	6.9	8.6	.	2.3
UA	.	.	.	.	.	2.8
UK	.	14.8	.	13.3	9.3	.
min	2.8	3.8	3.0	2.4	1.6	2.0
mean	10.7	11.8	11.3	12.9	7.4	5.4
max	32.8	20.5	23.9	22.2	22.7	13.2

Sources: ESS 2002–2007, EU-SILC 2004–2006, cross-sectional files from Eurostat, EU-LFS 2003–2005, files from Eurostat (second quarter used only). Own calculations. Respondents aged 25–64. Weighted using the design weight (*dweight*) in the ESS, the cross-sectional weighting factor (*pb040*) in EU-SILC and the quarterly weighting factor (*coeff*) in the EU-LFS. *Notes:*
* = Data for ESS round two for IT were only collected in 2006, they are still compared with EU-LFS 2005.
† Since for UK, EU-LFS data are only available for 2005 and ESS data for 2002 and 2006, the comparisons between EU-LFS 2005 and ESS round three and ESS round one and ESS round three are shown.

also decreased. The exceptions are DE (where the comparable variable was re-constructed from the instruments rather than corrected) and ES. There might be a problem specifically with the round two data for ES (see also Ortiz, 2008, p. 142–143). The dissimilarity index comparing the corrected harmonised variable for rounds one and three amounts to 'only' 11.7 % (not shown), and the dissimilarity index comparing the CSEV for rounds two and

three amounts to 17.7 %.[94] There are too many respondents in the lowest country-specific response categories, especially 0, 1, 3 and 4 (see Table D.1, page 396), which also show rather higher numbers of *years of education* than expected (see Table D.2, page 433).

94 Since the CSEV has changed in round two, round one cannot be compared to rounds two and three using the source variable.

Part III

INFORMATION CONTENT OF CROSS-NATIONAL MEASURES OF EDUCATIONAL ATTAINMENT IN THE EUROPEAN SOCIAL SURVEY

INTRODUCTION

In this third part of the study, the quality of different cross-national measures of educational attainment in survey data will be examined with respect to their information content as compared to the country-specific education variables (CSEVs). The aim of this part is thus to evaluate the consequences of harmonising CSEVs for substantive comparisons across European countries.

In Chapter 6, the dispersion of educational attainment according to the CSEVs will be compared with the dispersion of educational attainment data harmonised using both ISCED 97 and CASMIN. As a consequence of this, an alternative simplification of ISCED that incorporates the construction principles of CASMIN is proposed.

In Chapter 7, different measures of educational attainment, now including *years of education*, will be subjected to a construct validation: The explanatory power of different cross-national measures of educational attainment will be compared with the explanatory power of the country-specific measures. As outcome variables, occupational status and social class attainment are chosen.

6

THE DISPERSION OF EDUCATIONAL ATTAINMENT USING DIFFERENT MEASURES OF EDUCATIONAL ATTAINMENT

Chapter 4 and Chapter 5 of this study have investigated the consistency of harmonised educational attainment measures and data, looking at consistency over time within data sources, across surveys, and across countries. Another important criterion of data quality is however the richness of information of variables. As is obvious from the fact that categorical data are usually harmonised by the aggregation of (detailed) response categories into more generic groupings, harmonisation necessarily entails some loss of information (Granda et al., 2009, see e. g.). This can also be observed when closely comparing Table D.1 and Table B.5: in all countries that used a CSEV that was not adapted to the needs of the ESS from the outset (such as FI), the level of detail is higher in the CSEV than in the harmonised variable. Thereby in addition to questioning the consistency of cross-nationally harmonised measures of education, we need to question the *information content* of such measures.

First of all, it must be 'decided' if educational attainment is located at the ordinal or nominal level of measurement (Section 6.1). Then, the level of dispersion of the CSEVs will be compared with the level of dispersion of the corrected harmonised education variable in the ESS, i. e. the six-level ISCED 97, and the CASMIN education scheme (Section 6.2). Since this will show that the

levels-only version of ISCED contains substantially less information than both the CSEVs and CASMIN, a different simplification of ISCED 97 will be proposed that incorporates some characteristics of CASMIN (Section 6.3).

In EU-SILC and EU-LFS, no CSEVs are included in the data files since these are not delivered to EUROSTAT by the NSIs. The ESS however contains CSEVs for most countries. Most of analyses in this and the next chapter will thus all be based on the ESS.

6.1 IS EDUCATIONAL ATTAINMENT MEASURED AT THE ORDINAL OR NOMINAL LEVEL?

Variables can be measured at three levels of measurement: nominal (unordered categories), ordinal (rank-ordered categories) and interval (numerically meaningful values) (e. g. de Vaus, 2002, p. 41). With ordered or interval level information, variation amongst individuals allows us to describe vertical or status differences, such as income inequality. Educational attainment is, like social class (see Rose and Pevalin, 2002, p. 95), a borderline case with respect to level of measurement.

At a fairly aggregate level, it is usually easy to order categories of educational attainment: individuals who have completed secondary education are more highly educated than individuals who have completed only primary education, and individuals who have completed tertiary education are more highly educated than individuals who have completed secondary education. However, as soon as different curricula or types of education (such as general and vocational; academic and professional) are reflected within these broad levels, ordinality becomes far less straightforward, so that educational attainment cannot be ordered along one single continuum 'a priori'. The ordering

of educational attainment categories *within* broad levels depends on which outcome or aspect of educational attainment we look at, e. g. duration of the educational career, prestige of the highest educational certificate obtained, or income returns to education (see also de Vaus, 2002, p. 44–45).

As a working hypothesis, the relationship between educational attainment and different outcomes are here assumed to differ across countries, and therefore no ordering will be imposed. Upper secondary *vocational* education e. g. could be 'worth' more than *general* upper secondary education in one country, but it could be the other way round in another country. Therefore, educational attainment can at best be regarded as a 'partially ordinal' variable. It will thus be analysed using methods suitable for variables measured at the nominal level throughout this study.

6.2 ANOTHER LOOK AT DISTRIBUTIONS: VARIATION OF DIFFERENT MEASURES OF EDUCATIONAL ATTAINMENT

To state it at the most trivial level, variables contain information because they vary across units of analysis. The level of variation is the crucial characteristic of a variable that enables us to relate different variables (and thus indirectly theoretical concepts) with each other empirically. Empirical social research often tries to explain variation in one measure by variation in another, based on theoretically informed hypotheses.

However, variation is also often of interest for a description of societies, since it measures theoretical concepts such as inequality and heterogeneity (Blau, 1977). In ecology, measures of heterogeneity are used to determine the richness in species of ecosystems; in sociology, the ethnic or religious diversity of cities or societies; in political science the plurality of party systems etc.

When looking at the distribution of the ISCED 97 variables in EU-SILC and the EU-LFS in Tables B.2 and B.3 and the corrected variable in the ESS in Table B.5, two issues become obvious that have not been discussed so far: The concentration of respondents in specific categories, most notably in EU-SILC and the ESS, but sometimes also in the EU-LFS, and the scarceness of data in some other categories.

For instance, large proportions (up to nearly 80 %) of the sample fall into a single ISCED level in EU-SILC and the ESS in a number of countries. This is clearly most problematic at ISCED level 3, and particularly in Central and Eastern Europe and countries with a strong apprenticeship tradition: In AT, BG, CH, CZ, DE, EE, FR, HU, LV, PL, SE, SI, and SK more than 40 % of the population are consistently classified as ISCED level 3. In CZ, PL and SK, the percentage of respondents in level 3 is even larger than 60 % (and HU and SI come close). In fact, the communist governments in Central and Eastern Europe successfully encouraged people to continue education beyond the basic level, especially by promoting polytechnic upper secondary education (Kogan, 2008, p. 9–10).

At the same time, quite diverse qualifications are awarded at this level of education, namely *general* and different kinds of *vocational* ones, with sometimes *technological* qualifications being available additionally. Furthermore, some qualifications (usually the general and technological ones) give access to university education and others (usually the vocational ones) do not—information that remains hidden when using the levels-only version of ISCED 97. The distribution of pupils across the different tracks can also differ strongly across countries (for Central and Eastern Europe, see e. g. Kogan, 2008). Finally, given the high graduation rates from upper secondary educa-

tion in advanced economies (see e. g. OECD, 2003a, p. 35), this will become even more problematic in the future.

The EU-LFS version of ISCED shows that making some use of the 'destination' sub-dimension improves the situation a lot for CZ and SK and other countries where there is a strong differentiation of the population across ISCED 3AB and 3C. However, since this implementation of ISCED does not distinguish ISCED 3A and 3B, the combined category 3AB still shows more than 50 % of the cases in AT and DE because apprenticeships in these countries are classified as ISCED 3B since they prepare for master crafts programmes classified as 5B.

In DK and NO (both in rounds two and three) as well as in EE (round 3), IL, RU, UA and the UK, close to or more than 40 % of the sample are classified as ISCED level 5 and 6 in the ESS. EU-SILC records around 30–35 % of the sample in this category for these countries. Other countries show around or more than 30 % in ISCED level 5 and 6 in both surveys (BE, CH, CY, DE with the exception of EU-SILC 2006, FI, IS, SE). Again, we know that this category is rather heterogeneous since there are short vocational programmes (classified as ISCED 5B) as well as undergraduate and postgraduate university degrees (classified ISCED 5A) and PhDs (ISCED 6) included in this one category. These important distinctions are not reflected by the six-level ISCED 97.

As with respect to ISCED level 3, a look at the more detailed ISCED variable in the EU-LFS is helpful: most countries show substantial differentiation across ISCED 5B and 5A. NO however doesn't (ISCED 5B exists, but is not identified in the data, see Section 5.1.3). A distinction of first or medium duration university degrees and second or long duration degrees would probably be useful, especially in those countries where ISCED 5B is marginal. It will also become more important in other countries because of the Bologna reforms

(see e. g. Eurydice, 2009). Since the EU-LFS doe not make use of these subdimensions for 5A, there is no empirical evidence on this yet.

The size of categories might also be problematic at ISCED level 1 in PT and TR, although the level of heterogeneity is probably rather low at this level of education.

Finally, in most European countries, the differentiation between ISCED 0 and 1 is negligible, as is ISCED level 6 (which amounts to around 1 % of the sample in most countries, see Table B.3). ISCED 4 does not exist in all countries, is not captured in quite a few, and is marginal in some others, which can often be explained by the fact that CSEVs do not cover the respective qualifications very well (see Section 5.1.3 and Schneider and Kogan, 2008). Therefore, the bulk of cases are found at ISCED 2, 3 and 5 in the large majority of countries.

How informative is a variable in which most cases are found in three categories out of six or seven? The degree of variation of a variable can be summarised using a single measure of dispersion. As suggested by Granda et al. (2009) for evaluating the quality of harmonised categorical variables, comparing the dispersion of country-specific and harmonised variables inform us about the relative information content of harmonised variables. For nominal level variables like education here, Simpson's index of diversity (Simpson, 1949) and Mueller et al.'s Index of qualitative variation (IQV, Mueller et al., 1970) are adequate measures.[95] Given p_i as the proportion of cases falling

95 They are further discussed by Lieberson (1969), Gibbs and Poston (1975) and Agresti and Agresti (1978).

in category i of a nominal variable with k categories, Simpson's index of diversity is following Gibbs and Poston (1975) defined as[96]

$$\text{Simpson's index} = 1 - \sum_{i=1}^{k} p_i^2 \tag{6.1}$$

It ranges from 0 to $1 - 1/k$ and thus reflects the number of categories as an integral aspect of diversity: a variable with five categories has a maximum diversity index of 0.8, whereas one with ten categories has a maximum of 0.9.

Using the same notation, Mueller and Schuessler's IQV adjusts Simpson's index by its maximum, i. e. by the number of categories of the nominal variable. Again, following Gibbs and Poston (1975), it is defined as

$$\text{IQV} = \frac{1 - \sum_{i=1}^{k} p_i^2}{1 - 1/k} \tag{6.2}$$

$$= \text{Simpson's index} * k/(k-1) \tag{6.3}$$

IQV ranges from 0 to 1, with 1 occurring if cases are evenly split over categories ($p_i = 1/k$). The IQV thus measures dispersion net of the number of categories of the variable in question.

Both indices are shown for the CSEVs, six-level ISCED and CASMIN in Table 6.1. They are multiplied by 100 in order to improve readability. The summary statistics across countries and ESS rounds are given in three panels in order to take account of the fact that ISCED and CASMIN cannot be coded for all countries. Only the original eight-category version of CASMIN was coded since the CSEVs in many countries did not allow any further level of detail.[97]

96 Usually, the index of diversity is denoted as D. In order to avoid confusion with the dissimilarity index introduced in Chapter 4, it will be referred to as Simpson's index throughout.

97 CASMIN was coded using the (sometimes slightly amended) mapping information in Brauns et al. (2003); Brauns and Steinmann (1997); Ishida et al. (1995); König et al. (1987) and Müller and Klein (2008). Since these mappings do not cover all countries that have sufficiently

TABLE 6.1: Dispersion of educational attainment measures in the ESS

Country	ESS round	k	Simpson's index*100			IQV*100		
		CSEV	CSEV	ISCED	CASMIN	CSEV	ISCED	CASMIN
AT	1	5	72.8	.	.	91.0	.	.
AT	2	6	69.7	.	.	83.6	.	.
AT	3	6	69.4	.	.	83.3	.	.
BE	1	11	88.4	70.0	83.0	97.2	84.0	94.8
BE	2	11	87.9	68.9	82.1	96.7	82.7	93.9
BE	3	11	87.2	68.3	81.9	96.0	82.0	93.6
BG	3	6	66.4	66.4	.	79.7	79.7	.
CH	1	15	81.3	55.6	75.0	87.1	66.7	85.8
CH	2	15	79.7	55.2	73.1	85.4	66.3	83.6
CH	3[c]	13	80.9	59.9	76.1	87.6	71.8	87.0
CY	3	6	68.2	64.6	.	81.8	77.5	.
CZ	1	11	82.8	37.1	75.6	91.1	44.6	86.4
CZ	2	11	81.4	36.7	73.4	89.5	44.0	83.9
DE	1	17	86.1	59.4	78.0	91.5	71.3	89.1
DE	2	17	86.7	59.5	79.2	92.1	71.5	90.5
DE	3[c]	18	85.0	56.9	78.1	90.0	68.3	89.3
DK	1	10	74.8	61.3	69.8	83.1	73.6	79.8
DK	2[c]	9	79.7	60.8	73.0	89.7	73.0	83.4
DK	3	9	80.2	60.4	73.9	90.2	72.5	84.4
EE	2	12	85.1	64.6	.	92.8	77.5	.
EE	3[c]	15	89.5	63.6	67.7	95.9	76.3	77.4
ES	1	14	87.2	81.7	.	93.9	98.1	.
ES	2[c]	17	90.7	79.6	.	96.4	95.5	.
ES	3	17	90.7	80.6	.	96.3	96.7	.
FI	1	6	71.2	70.4	.	85.4	84.5	.
FI	2	6	69.0	67.5	.	82.7	80.9	.
FI	3	6	68.3	66.8	.	82.0	80.1	.
FR	1	11	88.5	68.9	86.2	97.4	82.7	98.5
FR	2	11	88.5	68.8	86.3	97.4	82.5	98.6
FR	3[c]	12	89.5	66.0	86.1	97.6	79.2	98.4
GR	1	7	77.5	75.8	.	90.5	91.0	.
GR	2	7	77.5	75.1	.	90.4	90.1	.
HU	1	11	78.3	59.8	78.1	86.1	71.7	89.2
HU	2[c]	14	84.0	65.6	78.2	90.5	78.7	89.4
HU	3	14	81.2	64.9	77.5	87.4	77.9	88.5
IE	1	7	81.4	.	.	95.0	.	.
IE	2	7	80.9	.	.	94.4	.	.
IE	3	7	82.3	.	.	96.0	.	.
IL	1	14	88.8	62.1	.	95.6	74.6	.
IS	2	6	78.4	66.3	.	94.1	79.5	.
IT	1	7	70.1	69.6	.	81.7	83.5	.
IT	2[c]	8	71.2	70.2	.	81.4	84.3	.

Continued on the next page

TABLE 6.1: Dispersion of educational attainment measures in the ESS (*continued)*

Country	ESS round	k	Simpson's index*100			IQV*100		
		CSEV	CSEV	ISCED	CASMIN	CSEV	ISCED	CASMIN
LU	1	19	91.5	71.2	.	96.5	85.4	.
LU	2	19	91.2	74.6	.	96.3	89.5	.
NL	1	13	85.6	72.7	82.2	92.7	87.3	93.9
NL	2	13	86.3	73.9	82.6	93.5	88.7	94.4
NL	3	13	87.3	74.7	83.1	94.6	89.6	95.0
NO	1	9	77.0	58.6	.	86.6	70.4	.
NO	2†	8	82.2	68.2	.	94.0	81.8	.
NO	3	8	82.3	66.9	.	94.0	80.3	.
PL	1	10	80.0	56.8	76.0	88.9	68.2	86.9
PL	2c	8	78.1	53.3	74.3	89.3	64.0	85.0
PL	3	8	77.5	54.0	74.3	88.6	64.9	84.9
PT	1	8	78.7	65.2	.	89.9	78.3	.
PT	2	8	78.5	63.5	.	89.8	76.2	.
PT	3c	10	77.2	65.7	.	85.8	78.8	.
RU	3	12	77.3	53.3	78.1	84.3	64.0	89.3
SE	1	12	86.5	64.9	79.1	94.4	77.9	90.4
SE	2	12	86.3	65.1	78.8	94.2	78.2	90.1
SE	3c	13	88.4	64.7	78.6	95.8	77.7	89.8
SI	1	7	77.8	59.3	.	90.8	71.2	.
SI	2	7	76.5	56.0	.	89.2	67.2	.
SI	3	7	78.0	59.0	.	91.0	70.8	.
SK	2	8	71.5	45.0	.	81.7	54.0	.
SK	3	8	72.7	46.9	.	83.1	56.3	.
TR	2	6	68.7	68.7	.	82.4	82.4	.
UA	2	7	67.8	.	.	79.1	.	.
UA	3	7	70.1	.	.	81.8	.	.
UK	1	8	78.5	64.7	.	89.8	77.7	.
UK	2c	7	78.9	.	.	92.0	.	.
UK	3c	7	76.7	62.3	.	89.5	74.7	.
min		5	66.4			79.1		
mean		10	80.1			90.0		
max		19	91.5			97.6		
Only countries with ISCED:								
min		6	66.4	36.7		79.1	44.0	
mean		11	80.5	63.8		89.9	76.6	
max		19	91.5	81.7		97.6	98.1	
Only countries with CASMIN:								
min		8	74.8	36.7	67.7	83.1	44.0	77.4
mean		12	83.7	61.3	78.0	91.5	73.6	89.2
max		18	89.5	74.7	86.3	97.6	89.6	98.6

Source: European Social Survey 2002–2007, own calculations. Respondents aged 25-64. Weighted using the design weight (*dweight*). *Notes:* Harmonisation corrected for inconsistencies over time and deviations from ISCED mappings. c = CSEV changed in this round

The degree of variation on the educational attainment variable is, as expected, highest using the CSEV when not taking the number of education categories into account. ISCED shows throughout lower levels of dispersion, even when controlling for the number of categories. For those countries where it could be coded, CASMIN lies in between CSEV and ISCED. The level of dispersion of CASMIN however lies much closer to the level of dispersion of the CSEVs than to that of ISCED in all countries but EE.[98]

In FR, HU (rounds one and three), NL and RU, CASMIN even shows a higher degree of dispersion than the CSEV as soon as the number of response categories is taken into account using the IQV rather than Simpson's index. For RU this is probably due to the way CASMIN was implemented, whereby the country-specific category for special technical education (Среднее специальное образование: техникум, училище, колледж) was split across CASMIN 2a and 3a using the age of the respondents in order to reflect the upgrading of special technical education (see Gerber and Hout, 1995, p. 630).

Some more observations regarding the level of dispersion of the different educational attainment variables are in place. Firstly, there is a high to medium degree of association between the number of categories k of the CSEV and Simpson's index of the CSEV ($p = 0.78$) on the one hand and the IQV ($p = 0.47$) on the other. Therefore, even when the number of categories is taken into account by the measure of dispersion, dispersion is related to the level of detail of the CSEV. This suggests that more detailed CSEVs are more

detailed CSEVs for implementing CASMIN, information for some other countries was retrieved from studies using CASMIN: Buchmann et al. (2007) for Switzerland, Layte and Whelan (2004) for Ireland and Gerber and Hout (1995) for the Russian Federation (RU). The mapping for the Czech Republic (CZ) was developed in collaboration with Aleš Bartušek, the one for Estonia with Ellu Saar and the one for Netherlands with Ruud Luijkx and Manon de Heus. The assignments for the remaining countries (Austria, Belgium, Denmark, Luxembourg, Israel, Slovenia, Slovakia) were made independently, sometimes with advice from country experts.

98 In EE CASMIN does not seem to work well. This is due to the large number of people classified in 2c in EE. If 2c (gen) and 2c (voc) are distinguished, the IQV amounts to 90.3 for EE. This distinction could however not be implemented for RU and DK, so it was decided to use the more collapsed version of CASMIN here.

capable to represent diversity over and above what the mere number of categories would imply. Countries using only six or seven categories in their CSEV show particularly low levels of dispersion in educational attainment.

To summarise, the six ISCED 97 levels do not well reflect the diversity of country-specific educational attainment categories. CASMIN in turn is able to reflect levels of dispersion that are much closer to the original CSEVs. Therefore, it seems to be possible *in principle* to construct a cross-national educational attainment variable that is comparable and informative at the same time. However, CASMIN cannot be coded for the majority of countries covered in the ESS because the CSEVs employed in many countries do not allow distinctions that are necessary for the construction of CASMIN, most notably the distinction of qualifications from vocational and general education programmes at the upper secondary levels. What is more, CASMIN 'mappings' are only available for a restricted number of countries, and they do not rely on an international terminology like ISCED does. Therefore, before moving on to examine the predictive power of the different cross-national education variables, an alternative way of simplifying ISCED that is inspired by the CASMIN scheme is proposed in the next section.

6.3 AN ALTERNATIVE SIMPLIFICATION OF ISCED 97: THE EUROPEAN SURVEY VERSION OF ISCED 97

There is an obvious gap between the degree of complexity the ISCED classification offers and the typical requirements of data users. Researchers would not like to include 15 or more dummy variables for educational attainment in their statistical analyses. Equally, international organisations, largely relying on cross-tabulations in their publications, would not be able to present data on all level of detail provided by ISCED in a readable way. The analysis

and presentation of such data would also be difficult since some categories would be empty or only sparsely populated in some countries, but not others.

Therefore, at present, for harmonising educational attainment data in cross-national surveys, the common practice is to simply collapse all subcategories within the seven main levels of ISCED 97 (EU-SILC also collapses ISCED levels 5 and 6) and thereby drop all differentiation within levels. A detailed version of ISCED 97 is thus currently not used in any actual survey apart from maybe the EU-LFS, which however also collapses certain ISCED categories and does not make use of the important sub-dimension 'programme orientation'. The use of ISCED main levels as a measure of educational attainment relies on the assumption that the differences in educational content *between* ISCED levels are larger and/or more relevant than the differences between categories *within* ISCED levels.

Is this assumption justified? For example, is the difference between an individual who has not even completed primary education and an individual who has completed primary education but not lower secondary really more relevant *in the European context* than the difference between an individual who completed vocational upper secondary education not allowing university enrolment and an individual who completed general upper secondary education that does prepare for university entry? Again, this will often depend on the outcome with respect to which 'differences' are assessed. But we can certainly doubt that making a distinction within a category that contains only around 1 % of the population is more relevant than a distinction within a category that contains more than 30 % of the population. Therefore, the simplification into ISCED *levels* is neither a substantively meaningful nor statistically efficient strategy.

How can a satisfactory degree of differentiation be achieved without excessively increasing the number of categories to be used in actual statistical analyses or cross-tabulations? In order to achieve this, it is useful to regard ISCED 97 as a classification with a *nested structure*, like e. g. the British National Statistics Socio-economic Classification (NS-SeC, see Rose and Pevalin, 2002, p. 91–93). ISCED 97 is not actually used like this by the UNESCO, EUROSTAT or the OECD, but could be easily thought of or even transformed into a nested classification. Then the most detailed level with all sub-categories representing the ISCED sub-dimensions is the operational level, used for the harmonisation of country-specific education categories and support the continuity of time series data. The operational ISCED categories can be recoded into analytical versions of the classification in many different ways, and the 'levels only' ISCED 97 is one of them. But there are more ways in which ISCED could be simplified for statistical analyses and cross-tabulations alike:

Firstly, one could focus a specific analysis or cross-table on certain aspects of educational attainment only—e. g. types of upper secondary education, early school leaving, or the contrast between ISCED 5A graduates and all others. This is the most useful approach when using educational attainment as a response (dependent) variable. Since in this case the substantive interest lies in these specific aspects of education from the outset, the problem of defeating complexity actually does not come up in the first place. However, it might still be useful to consider using ISCED criteria also for harmonising those dependent variables when doing cross-national research.

Secondly, if the purpose of some analyses requires the whole range of educational attainment be represented, especially when educational attainment is an explanatory or control variable, one could try to improve the distinctiveness of the harmonised education categories. Since the levels-only ISCED 97

does not look like an optimal way of simplifying ISCED 97, a 'differently simplified' analytic version of ISCED 97 for use in European and possibly other developed countries is proposed here: The European Survey Version of ISCED 97 (ES-ISCED).

ES-ISCED offers a more efficient simplification of ISCED 97 by collapsing certain (sub-)categories of the classification, but not others, so that important distinctions are maintained, whereas less relevant ones are dropped. ES-ISCED builds on the concepts and mappings of country-specific to international categories provided by ISCED 97, but incorporates some conceptual ideas behind the CASMIN scheme (see Section 2.2.3) in order to decide *which* categories to differentiate. Because of the conceptual underpinning of ES-ISCED as compared to the 'naive' reliance on ISCED main levels, this version of ISCED can be expected to be more efficient (i. e. containing more information in the same number of categories) and thus more powerful than the 'levels-only' version of ISCED 97 commonly used.

In ES-ISCED, ISCED levels 0 and 1 are summarised in one category. ISCED level 2 remains as is. The various sub-categories within ISCED level 3 are simplified to a dichotomy, and ISCED level 4 is absorbed into the adjacent levels. ISCED level 6 finally is so small that it is not efficient to reserve an extra category for it (unless there is an explicit interest in respondents with PhDs, which however requires larger samples than available in most cross-national surveys). It is much more efficient to distinguish between lower (BA-level) and higher (MA- and PhD-level) university qualifications instead. Figure 6.1 visualises how the detailed ISCED 97 categories are re-classified into ES-ISCED.

The seven categories of ES-ISCED are thus defined in the following way:

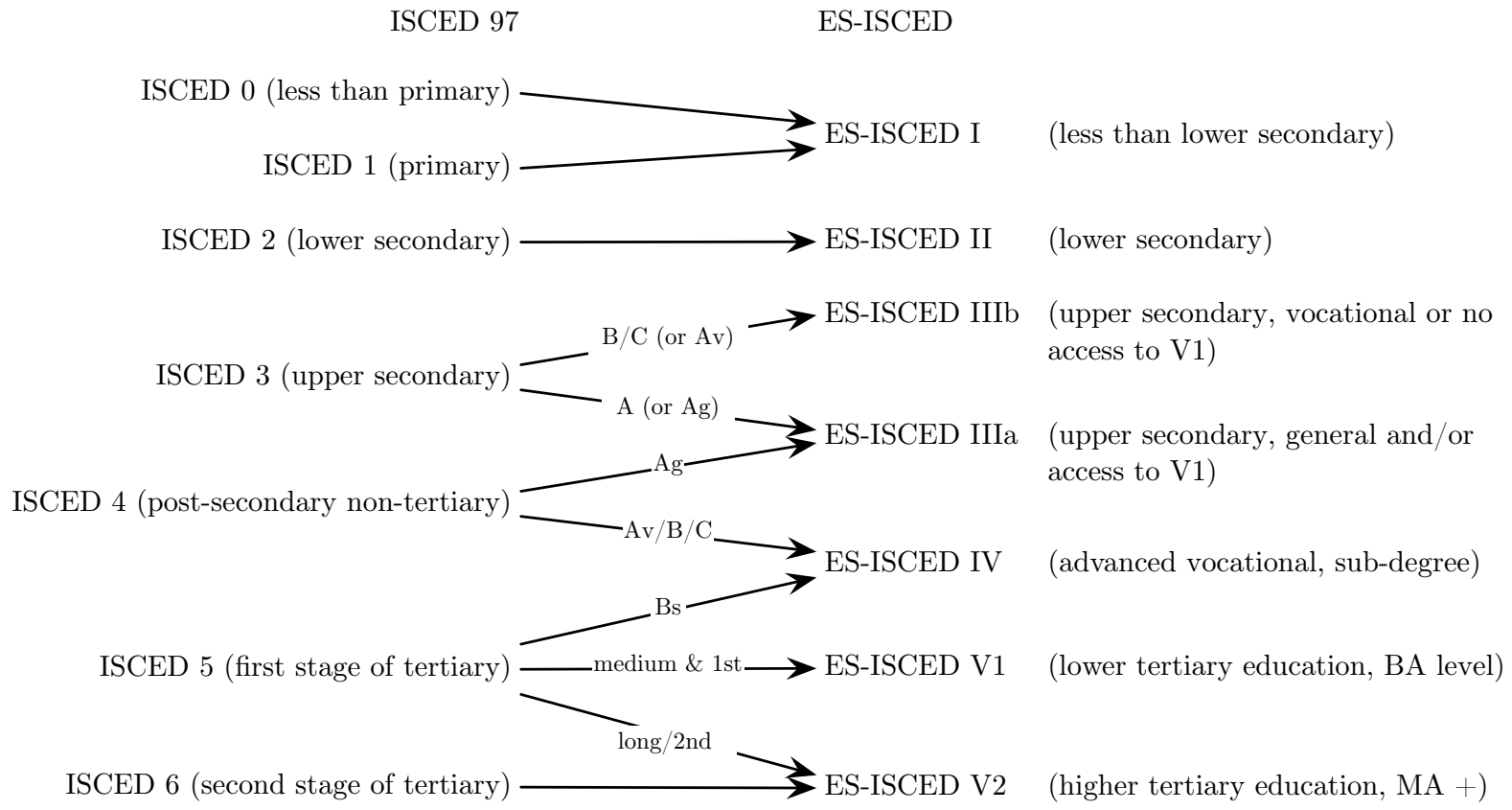


FIGURE 6.1: Re-classification of detailed ISCED categories into ES-ISCED

I NO EDUCATIONAL QUALIFICATIONS or only primary education completed. This category summarises ISCED levels 0 and 1 and corresponds to CASMIN category 1a. It is small in most European countries today. For parental education and immigrants, the distinction between less than primary education and at least primary education might however be more important. If the target concept is *parental* education or if a study is particularly interested in the educational attainment of *immigrants*, a category 0 should thus be re-introduced.

II LOWER SECONDARY EDUCATION: This category corresponds to successfully completed ISCED level 2 and CASMIN categories 1b and 2b. If lower secondary schooling as defined by ISCED does not conclude with any educational certificate in some country, individuals who have completed lower secondary education and would be eligible for enrolment in general upper secondary education should be classified here rather than in category I. Very low levels of vocational education after the completion of ISCED level 2 (short ISCED 3C programmes) should be included here, too, as intended by ISCED 97.[99]

III UPPER SECONDARY EDUCATION. This level corresponds to ISCED level 3 and CASMIN categories 2a and 2c (and partially 1c) and is subdivided into two categories:

99 In some countries, different kinds of qualifications are awarded at the end of lower secondary education. On the one hand, there are qualifications that prepare for access to general upper secondary education (e. g. *Mittlerer Schulabschluss mit Qualifikation für die gymnasiale Oberstufe* in DE), and, on the other hand, there are qualifications that do not give access to general, but to vocational upper secondary education (e. g. *Hauptschulabschluss* in DE; *voorbereidend beroebsonderwijs* (VBO)/*middelbaar algemeen voortgezet onderwijs* (MAVO) or nowadays *voorbereidend middelbar beroebsonderwijs* (VMBO) levels 1-3 in NL). In most countries however, there is no such distinction between types of lower secondary school leaving certificates any more today. Equivalent distinctions *within* a type of certificate cannot usually be made because the relevant criteria (e. g. streams or grade point average) are not recorded in the data. It is therefore difficult to split this category into two potential sub-categories, IIa and IIb, distinguishing qualifications preparing for general upper secondary education and qualifications restricting access to vocational training.

IIIB contains upper secondary qualifications that do not generally allow entry into ISCED 5A. These usually cover initial vocational qualifications of at least two years duration (e. g. Apprenticeships in the German-speaking countries, BEP and CAP in FR). In some countries, there are however also general programmes that do not conclude with a maturity examination that would be classified here. Short programmes at ISCED level 3C should be excluded from this category (they belong to category II, see above).[100]

IIIA contains upper secondary qualifications that give access to ISCED 5A. These are 1. classical university entrance certificates (*maturity; GCE A-Levels; Abitur; Baccalauréat; VWO* etc.), which are without exception 3Ag in ISCED 97, and 2. slightly lower or vocational 'alternative route' qualifications (e. g. *Fachhochschulreife* in DE; HAVO in NL; also 3Ag in ISCED, but one year shorter than *Abitur* or VWO; *Baccalauréat professionnel* in FR; vocational Matura in CZ and other countries; all 3Av in ISCED 97).[101] If someone completed a so-called 'access' or 'bridging' programme and thereby passes the maturity examination *after* having completed a IIIb programme (in ISCED this is 4Ag), this is also coded as IIIa.

If a country has 3A *and* 3B or 3C programmes, the dividing line between IIIb and IIIa is drawn between 3A on the one hand and 3B/3C on the other. If a country however only has 3A programmes at ISCED

100 In a number of countries, category IIIb could be further differentiated into lower (IIIbb) and higher levels (IIIba) of vocational education (e. g. CAP and BEP in FR, apprenticeships after Hauptschul- or Realschulabschluss in DE, different levels of MBO in NL). This is however unfeasible in most other countries because of the less developed or stratified TVET systems there.

101 For large samples, IIIa could thus be differentiated into general (IIIaa) and vocational/otherwise restricted (IIIab) university entrance qualifications (e. g. Abitur and Fachhochschulreife in DE, voorbereidend wetenschappelijk onderwijs (VWO) and *hoger algemeen voortgezet onderwijs* (HAVO) in NL, Bac général/technologique and Bac professionel in FR respectively). Since classical university entrance qualifications however occur rather rarely as someone's *highest* level of attainment, this distinction is not useful in most cases.

level 3 (e. g. EE, FI, the UK), the dividing line is drawn between general and vocational 3A programmes. The rationale behind this is that vocational educational programmes at the upper secondary level (for the UK, this is e. g. *General National Vocational Qualification* (GNVQ) *advanced level* or *National Vocational Qualification* (NVQ) *level 3*) do not *specifically* prepare for university entry, even if they give access to universities formally and thus tend to be classified as ISCED 3A (which could itself be put into question). Programme destination 'A' often comprises substantial curriculum differentiation (see e. g. Saar, 2008). Functionally, vocational upper secondary programmes are approximately equivalent across countries, no matter if *in a specific national context* they allow university entry or not.

IV POST-SECONDARY, SUB-DEGREE LEVEL: These are advanced vocational programmes, classified as 5Bs, 4Av, 4B and 4C in ISCED (e. g. *hoger onderwijs korte type* in BE, *Meister* and *Techniker* in DE, *Diplôme universitaire de technologie* (DUT) and *Brevet de technicien supérieur* (BTS) in FR, *Brevet de maîtrise* in LU, short *Hoger beroebsonderwijs* (HBO) in NL, *Higher National Certificate* (HNC) and *Higher National Diploma* (HND) in the UK). The dividing line between ISCED levels 4 and 5B is drawn using programme duration as a criterion, with two-year programmes classified as ISCED 5B and shorter programmes as ISCED 4Av, 4B or 4C. There is however no conceptual underpinning of this criterion. Furthermore, in the ISCED mappings, this criterion is not always followed, and what is considered as 'higher education' and what as merely 'post-secondary' from a national point of view sometimes seems to interfere with the official ISCED criteria.[102] This however should be irrelevant for a cross-national classification, and since the distinction

102 In LU for example, three-year Master crafts programmes are classified as ISCED 4C, whereas similar (but even shorter, namely two-year) programmes in DE are classified as 5B.

between ISCED levels 4 and 5B is difficult to draw in practice, it is dropped for ES-ISCED (with the exception of ISCED 4Ag qualifications, which are classified as IIIa, see above). In the CASMIN scheme, these qualifications are largely included in category 3a-voc, but sometimes also in 2a or 2c-voc.

V DEGREE LEVEL EDUCATION, corresponding to ISCED 5A and 6, CASMIN 3a-gen and 3b, is divided into two levels:

V1 LOWER DEGREE LEVEL, comprising 1. ISCED first and medium duration (three or four year) university degrees, usually at the Bachelor's or equivalent level (e. g. *Licence* in FR, the recently introduced three-year *Laurea* in IT)[103] and 2. qualifications from institutions that are not traditional universities (they usually do not award PhDs), but are nevertheless assigned to ISCED 5A in ISCED 97 (e. g. polytechnic college degrees like *Diplom (FH)* in DE and its equivalents in AT and CH, long HBO degrees in NL, *hoger onderwijs van het lange type* in BE).[104] Such institutions do not exist in all countries, but all countries have *either* Bachelor-type degrees *or* lower tier universities.[105]

V2 HIGHER DEGREE LEVEL, which consists of long university degrees and postgraduate qualifications, i. e. certificates at the Master's degree level and higher (at least four years of study alto-

103 In countries where the Bachelor degree has been introduced only recently, intermediate university qualifications can also be classified here (e. g. *Vordiplom* and *Zwischenprüfung* in DE).

104 In EE, such qualifications are assigned to ISCED 5Bm. These will also be included in V1 rather than IV.

105 It would be desirable to discriminate the first and second type of lower level university degrees. CSEVs usually make this distinction, but ISCED 97 does not. If a future revision of ISCED differentiated between different types of higher education institutions/degrees, e. g. by referring to broad fields of education, this could be absorbed into ES-ISCED as V1a for academic and V1b for professional/vocational degrees.

gether), including PhDs. In ISCED 97, this corresponds to '5A second or long' and ISCED 6; in CASMIN it is 3b-high.[106]

The number of categories of ES-ISCED is thus seven, which is just the same as in the levels-only version of ISCED 97. Table 6.2 shows an overview of ES-ISCED.

The strategy of going back to the original country-specific source data and recoding the data into new categories is very similar to the approach chosen by Erikson and Goldthorpe (1992, p. 49) for harmonising social class categories across countries. Using data from the first three ESS rounds, ES-ISCED can be coded for 15 countries. The CSEVs of the other countries lack some differentiations necessary for the construction of ES-ISCED, usually within ISCED levels 3 (e. g. BG, FI, IT, NO, PT, TR, the UK) and/or 5 (e. g. SE, TR, the UK), as this was not required for the construction of the ex-ante specified levels-only ISCED 97 in the ESS—a negative side-effect of the ex-ante harmonisation strategy.

However, as the mappings (Table D.2) show, in those 15 countries sometimes a compromise has to be made and ES-ISCED cannot be perfectly coded according to the rules described above either. For example, for BE, 4Av and 4C are included in the same country-specific education category as 3Av (*Secondaire supérieur technique/Hoger secundair technisch, zevend beroepsopleiding*). This will be coded as IIIa since this is the dominant sub-category. In CH, *berufliche Zweitausbildung* (second vocational qualification) can only be coded as ES-ISCED IV in round three; in the other two rounds, this is included in IIIb. In DE, these double qualifications cannot be distinguished in either ESS round (see also Schneider, 2008b). In DK, BA degrees are in the same category as MA degrees in round one (*Bachelor eller kandidateksamen fra universitet*). Both

106 As with V1, V2a for academic and V2b for professional qualifications could be distinguished here (see the previous footnote).

TABLE 6.2: The European Survey Version of ISCED 97

ES-ISCED	ISCED 97	g/v	dur. (yrs)	description of the qualifications included in the category
I	0, 1	g	<8	no formal qualification or only primary education
II	2, 3C<2yrs	g/v	8 to 11	lower secondary schooling completed, including vocational training that is not considered as completion of upper secondary education
IIIb	3B, 3C⩾2yrs	v	II+2 to 3	upper secondary education with (initial) vocational qualification without university access certificate (apprenticeships, vocational schools...)
	3B, 3C⩾2yrs	g	II+2 to 3	general upper secondary education without university access (rare)
	3A	v	II+2 to 5	upper secondary vocational qualifications giving access to higher education (only if no other qualifications at IIIb)
IIIa	3A	v	II+2 to 5	upper secondary vocational qualifications giving access to higher education (only if IIIb already filled)
	3A	g	II+2 to 5	upper secondary general qualification (maturity certificate) giving access to universities
	4A	g	II+4 to 5	3Ag plus 3B/C or second chance 3Ag
IV	5B, 4B, 4C, 4A	v	III+1 to 2	post-secondary/advanced vocational sub-degree level education (second cycle vocational training, master craftsmen, higher technicians, foremen, absolutorium ...)
V1	5Am		IIIa+3 to 4	short university/college education (academic BA)
	5Am		IIIa+3 to 4	lower tier university/college education (professional BA, polytechnic degrees)
V2	5Al		IIIa+4 to 6	long academic higher education (academic MA) and more, but <PhD
	5Al		IIIa+4 to 6	long professional/technical higher education (professional MA) and more
	6			PhD, doctorate

will be classified as V2 since BAs are rather rare as final attainment in DK. Also category V1 is already used for medium duration non-university qualifications (*Videregående uddannelser på ca. 4 år efter gymnasium eller faglig uddannelse*). From round two onwards, V1 and V2 will be distinguished based on programme duration in DK. For FR, ES-ISCED can only be coded from round three, and here also only using a compromise at the higher education level, classifying *Maîtrise* (included in the second cycle of higher education in FR), *Certificat d'aptitude au professorat de l'enseignement secondaire* (CAPES) as well as *Diplôme des grandes écoles* as V1 rather than V2. With respect to NL, short HBO qualifications (ES-ISCED IV) could not be split from medium duration ones (ES-ISCED V1). Since the latter is more common, the whole category is coded as V1.

6.4 AND YET ANOTHER LOOK AT DISTRIBUTIONS: ES-ISCED

How do the data look like when educational attainment is coded in ES-ISCED? Table B.6 shows the distributions of educational attainment in the ESS using the ES-ISCED. Looking at categories IIIb and IIIa, it seems that in some countries it is much more common to complete upper secondary education with a university entrance qualification without actually continuing to university than in others. This remains hidden when looking at the levels-only ISCED. Furthermore, in EE it looks like university degrees acquired during the socialist period are included in the category for Bachelor's degrees, so that V2 is rather small for EE, especially compared to RU, where the questionnaire item allows a separation of the (new) BA and MA degrees from the (old) long first degrees.

Comparing tables B.5 and B.6, ES-ISCED is more evenly distributed than the levels-only ISCED 97. However, there are still some countries where large

proportions of respondents accumulate in few categories. Category II is for example very common (> 30 %) in ES and NL, IIIa in CZ and SK, and IIIb in CH, CZ, DE, DK, HU, PL and SK. In no country however is any category larger than 50 %.

Table 6.4 shows Simpson's index and the IQV for those countries for which ES-ISCED can be coded, and repeats the respective information for the CSEVs, ISCED and CASMIN from Table 6.1. The summary measures are only shown for those countries for which CASMIN *and* ES-ISCED can be coded. On average, ES-ISCED displays around the same degree of dispersion as CASMIN. In CZ and DE however, ES-ISCED still shows substantially less dispersion than the CSEVs in these countries. Taking the number of categories of ES-ISCED into account, the relative dispersion (IQV) of ES-ISCED is even higher than that of the CSEV in DK and HU. In RU, the difference is again due to the fact that one of the country-specific education categories was split in two, following Gerber and Hout (1995).

Substantial changes over the three rounds of the ESS remain or (re)appear for a number of countries. Table 6.3 shows Duncan's dissimilarity index for ES-ISCED over the three ESS rounds. Compared to Table 5.5 (page 208) showing the same for the levels-only ISCED, there is more stability across ESS rounds in some countries (e. g. DE, ES) and less stability in others (e. g. CH, HU). For those countries only participating in one of the ESS rounds, D can of course not be calculated.

Overall, ES-ISCED might be a promising alternative to CASMIN for coding educational attainment data in cross-national surveys. It differentiates between different kinds of post-secondary education in a more efficient way than when ISCED is reduced to its main levels. It also distinguishes different types of upper secondary education. Thereby it shows higher levels of dispersion

TABLE 6.3: Duncan's Dissimilarity Index for educational attainment distributions across ESS rounds, ES-ISCED

	ESS rounds 1–2	ESS rounds 2–3
BE	2.8	2.8
CH	5.9	11.1
CZ	5.4	.
DE	2.9	5.8
DK	13.9	5.2
EE	.	6.4
ES	9.1	5.2
HU	18.0	15.8
LU	6.9	.
NL	5.2	5.3
PL	4.3	3.3
SK	.	3.3
min	2.8	2.8
mean	6.2	6.8
max	18.0	15.8

Source: ESS 2002–2007, own calculations. Respondents aged 25–64. Weighted using the design weight (*dweight*).

than the levels-only ISCED variable, and its information content will thus be closer to the original CSEVs. Its link to ISCED in addition ensures that with the help of the ISCED mappings, it can be coded for many more countries than CASMIN.

TABLE 6.4: Dispersion of ES-ISCED compared to other educational attainment measures in the ESS

Country	ESS round	k	Simpson's index*100				IQV*100			
		CSEV	CSEV	ISCED	CASMIN	ES-ISCED	CSEV	ISCED	CASMIN	ES-ISCED
BE	1	11	88.4	70.0	83.0	82.8	97.2	84.0	94.8	96.6
BE	2	11	87.9	68.9	82.1	82.5	96.7	82.7	93.9	96.3
BE	3	11	87.2	68.3	81.9	82.2	96.0	82.0	93.6	95.9
CH	1	15	81.3	55.6	75.0	73.5	87.1	66.7	85.8	85.8
CH	2	15	79.7	55.2	73.1	71.0	85.4	66.3	83.6	82.8
CH	3[c]	13	80.9	59.9	76.1	75.1	87.6	71.8	87.0	87.7
CZ	1	11	82.8	37.1	75.6	67.9	91.1	44.6	86.4	79.2
CZ	2	11	81.4	36.7	73.4	67.9	89.5	44.0	83.9	79.3
DE	1	17	86.1	59.4	78.0	71.2	91.5	71.3	89.1	83.0
DE	2	17	86.7	59.5	79.2	72.6	92.1	71.5	90.5	84.7
DE	3[c]	18	85.0	56.9	78.1	69.7	90.0	68.3	89.3	81.4
DK	1	10	74.8	61.3	69.8	74.1	83.1	73.6	79.8	86.4
DK	2[c]	9	79.7	60.8	73.0	79.5	89.7	73.0	83.4	92.7
DK	3	9	80.2	60.4	73.9	79.8	90.2	72.5	84.4	93.1
EE	2	12	85.1	64.6	.	78.8	92.8	77.5	.	92.0
EE	3[c]	15	89.5	63.6	67.7	79.9	95.9	76.3	77.4	93.2
ES	1	14	87.2	81.7	.	78.7	93.9	98.1	.	91.8
ES	2[c]	17	90.7	79.6	.	79.2	96.4	95.5	.	92.4
ES	3	17	90.7	80.6	.	80.0	96.3	96.7	.	93.3
FR	3[c]	12	89.5	66.0	86.1	82.2	97.6	79.2	98.4	95.9
HU	1	11	78.3	59.8	78.1	76.4	86.1	71.7	89.2	89.1
HU	2[c]	14	84.0	65.6	78.2	78.9	90.5	78.7	89.4	92.0
HU	3	14	81.2	64.9	77.5	76.9	87.4	77.9	88.5	89.7
IL	1	14	88.8	62.1	.	82.9	95.6	74.6	.	96.8
LU	1	19	91.5	71.2	.	81.6	96.5	85.4	.	95.2
LU	2	19	91.2	74.6	.	82.0	96.3	89.5	.	95.6
NL	1	13	85.6	72.7	82.2	77.9	92.7	87.3	93.9	90.8
NL	2	13	86.3	73.9	82.6	79.5	93.5	88.7	94.4	92.8
NL	3	13	87.3	74.7	83.1	80.5	94.6	89.6	95.0	94.0
PL	1	10	80.0	56.8	76.0	76.4	88.9	68.2	86.9	89.1
PL	2[c]	8	78.1	53.3	74.3	75.0	89.3	64.0	85.0	87.5
PL	3	8	77.5	54.0	74.3	74.9	88.6	64.9	84.9	87.4
RU	3	12	77.3	53.3	78.1	79.1	84.3	64.0	89.3	92.3
SK	2	8	71.5	45.0	.	68.5	81.7	54.0	.	80.0
SK	3	8	72.7	46.9	.	69.8	83.1	56.3	.	81.5
Only countries with CASMIN and ES-ISCED										
min		8	74.8	36.7	67.7	67.9	83.1	44.0	77.4	79.2
mean		12	82.9	60.3	77.3	76.4	90.6	72.4	88.4	89.2
max		18	89.5	74.7	86.1	82.8	97.6	89.6	98.4	96.6

Source: European Social Survey 2002–2007, own calculations. Respondents aged 25-64. Weighted using the design weight (*dweight*). *Note:* [c] = CSEV changed in this round

7

A VARIABLE RACE: COMPARING THE EXPLANATORY POWER OF DIFFERENT CROSS-NATIONAL MEASURES OF EDUCATIONAL ATTAINMENT

Chapter 6 has shown that different categorical measures of educational attainment display different degrees of dispersion. This means that they differ in their information content. Disregarding the number of categories of the variables, the levels-only ISCED variable had the lowest information content, the CSEVs the highest, and CASMIN and the ES-ISCED proposed in Section 6.3 lie in between. However, it is yet unclear what this actually means for research comparing countries in education related analyses. What is the effect of reclassifying CSEVs into the levels-only ISCED 97, CASMIN and ES-ISCED when comparing the association of educational attainment with some other variable across countries?

Furthermore, this study has so far restricted itself to examining *categorical* educational attainment variables, mainly ISCED 97. Another very popular supposedly cross-nationally comparable measure of educational attainment is *years of education*, either *actual* or *hypothetical/'virtual'* (see Section 2.2.1). How do *years of education* in both these forms compare with the CSEVs on the one hand and the categorical cross-national variables on the other?[107]

107 Since the procedure of 'effect-proportional scaling' ensures that the correlation between the scored education variable and the criterion is maximised, there is no use in including such measures in this evaluation.

In order to answer these questions, a construct validation strategy similar to the one used by Braun and Müller (1997), Kerckhoff and Dylan (1999), Kerckhoff et al. (2002) and Müller and Klein (2008) and more formally suggested also by Granda et al. (2009) is followed (see Section 3.1), comparing the predictive power of different measures of educational attainment using outcome variables known to be closely related to educational attainment. There are two central questions for assessing the validity of cross-national comparisons with these measures of educational attainment: 1. Which of the comparable measures displays the highest predictive power relative to the country-specific measure and can thus be regarded as most valid measure *within* countries? and 2. Which of the comparable measures shows least variation *across* countries in terms of loss of explanatory power (as compared to the country-specific measure), and can thus be regarded as displaying the highest degree of cross-national 'equivalence of construct validity' and thus comparability (see Section 3.4.2)?

The construct validation analyses performed in this chapter thus serve to compare the *relative* validity of cross-national measures of educational attainment as compared to country-specific measures, which are assumed to be valid (and if there are strong reasons to believe that they are not, e. g. because of too crude measurement, this is indicated in the interpretation of the results). The method of comparing a cross-national measure to a 'local' measure was also chosen by Ganzeboom et al. (1992) for validating the ISEI.

Construct validation relies on strong theories and thus well-established relationships among variables (Groves, 2004, p. 258). Such a validation cannot test the actual *validity* of a measure, but only its "*fruitfulness* for detecting interesting sociological relationships" (Evans, 1996, p. 212). The dependent variables chosen for this construct validation are core social characteristics

of individuals which are known to be closely related to an individual's educational attainment: 1. occupational status attainment, and 2. social class attainment.[108] The relationship between social stratification outcomes such as these and educational attainment is explained by several theoretical approaches, which can be divided into three main strands: human capital, signalling and allocation theory, which were already introduced when examining the concept of educational attainment (see Section 2.1). They will be briefly summarised in the next section.

7.1 THEORETICAL BACKGROUND

Human capital theory (Becker, 1993 [1964]; Schultz, 1961; Smith, 1981 [1776]) offers the most well-known and influential way of thinking about the economic consequences of education today, and represents a specific strand of socialisation theory. According to socialisation theory, education *changes* individuals in fundamental ways. Through diverse learning experiences, pupils and students develop and enhance their cognitive skills (particularly literacy, numeracy, reasoning and problem solving) and acquire knowledge of various sorts. Skills and knowledge improve the individual's capacity to perform labour and deliver services (productivity) and are thus conceived as the core elements of 'human capital'. From this perspective, education is an investment good.

Accordingly, economists often use educational attainment as an indicator for 'human capital'. Following neo-classical economic theory in that individuals are remunerated according to their marginal productivity, more skilled (or

108 Income is excluded because a) the ESS only contains a measure of household income rather than individual income or even earnings, which is unsuitable for analysing income returns to education, and b) income data are affected by larger amounts of missing data than occupation data, and c) occupational status is more stable than current income and is sometimes regarded as a better indicator of permanent income than income itself (Hauser and Warren, 1997).

educated) employees earn more than less skilled (or educated) employees. Because of their higher productivity, the former also find employment more easily and manage to secure more advantageous employment conditions than unskilled/uneducated individuals.

The allocation argument (Collins, 1971; Kerckhoff, 1976) was developed to contrast to the socialisation theory of education and builds on Max Weber's work on power and status in modern society. According to allocation theory, education does not *change* individuals, but individuals are *selected* to receive a certain amount and type of education. Educational systems are regarded as "societal forces which identify, select, process, classify and assign individuals according to externally imposed criteria" (Kerckhoff, 1976, p. 369). Whereas human capital theory regards education as *conditioning* job performance, allocation theory largely regards the effects of educational attainment on labour market outcomes as selection effects.

Later in life, personnel officers acting as gatekeepers use educational requirements for controlling access to positions in organisations. However, they do not observe the individuals' true characteristics (such as actual skills and motivation), but the acquired educational certificates. In this respect, allocation theory comes to identical predictions as some later variants of the human capital approach, which theorise that educational certificates become a decisive signal and screening device, e. g. for the applicants' technical capacities and trainability (Spence, 1974), personal characteristics like punctuality, self-confidence, motivation and perseverance (Berg, 1970; Dore, 1976) or class-based cultural dispositions among the elite (Bourdieu and Passeron, 1977; Collins, 1979) over and above the skills and knowledge acquired in education. The third variables on which individuals are initially selected

into education are e. g. cognitive ability, social class background or middle class culture of the family of origin.

This is not the place to discuss these approaches further or test their relative merits. Obviously neither human capital nor allocation act in isolation of each other: Most theorising on socialisation and allocation theory assumes combined effects of both models since there is neither a fixed (as implied by allocation theory) nor endlessly expandable (as implied by human capital theory) set of positions in society. Education changes the structure of positions in society to some degree, and individuals are allocated within this 'changing structure'. Also, the process of educational attainment itself consists of *both* selection and socialisation aspects.

What is most relevant in the context of this study is that all theories predict that higher levels of educational attainment, among other effects, improve an individuals' labour market prospects. There is thus a strong theoretical base for conducting a construct validation using occupational status and social class attainment as outcome variables.

Moreover, the theoretical approaches however would operationalise educational attainment in different ways: Whereas allocation and screening or signalling approaches would call for information on educational certificates, the 'pure' human capital approach does not have that requirement and would rather need a measure of education that captures all education and training *attended*. Because of the heterogeneity of the education concepts employed in the different ESS countries (see Chapter 5), this cannot be taken into account in a systematic way in this study.

7.2 DATA AND METHODS

For the construct validation analyses performed here, data from the ESS are used. The ESS meets the conditions for construct validation of cross-national measures of educational attainment: it includes CSEVs that can be used as a benchmark; covers a large number of countries and the required response variables. In addition to the simplified version of ISCED 97 and the CSEVs, the ESS also contains a variable asking respondents for how many (full-time equivalent) years they spent in education.[109]

Actual years of education are top-coded at a value of 31, from where onwards the distribution trailed out. In addition, *hypothetical years of education* were coded from the CSEVs. This was done taking the theoretical cumulative *years of education* at the end of the programme according to the ISCED mappings (counting from primary education onwards) as well as the actual duration into account.[110] If the cumulative actual duration was substantially shorter than the theoretical duration reported in the ISCED mappings, the former was given preference because the mappings only report *current* durations. Many educational programmes had a shorter cumulative duration in the past though, which is what shows up in the summary statistics of the actual duration by country-specific education categories.[111] On the other hand, since the questionnaire item on *actual years of education* does not explicitly ask respondents to include vocational training, sometimes an adjustment towards the theoretical cumulative duration as given in the ISCED mappings

109 Questionnaire item F7, round three: 'About how many years of education have you completed, whether full-time or part-time? Please report these in full-time equivalents and include compulsory years of schooling.'

110 These data are included in the mappings in Table D.2 in the appendix, with the actual cumulative duration summarised as the mode, median and mean *actual years of education* by country-specific education category.

111 Strictly speaking, different values of *hypothetical years of education* would have to be coded for the same education categories for different birth/education cohorts. Since this requires information on educational reforms in all ESS countries for the last 50–60 years, this was not attempted.

had to be made since it seems that respondents did not include years of vocational training (this was e. g. the case in CH). In LU and NL, it seems like pre-primary education was sometimes counted in *actual years of education* (the questionnaire item did not explicitly ask to exclude pre-primary education). In some categories thus a downward adjustment also had to be made. Finally, sometimes the summary measures of actual duration rely on only very few cases.

Overall, some judgment is involved in coding *hypothetical years of education* from the available data, and different codings are definitely possible. As is probably common practice, the fact that the CSEVs often mix qualifications of differing durations in one category is ignored and one specific duration is 'picked' according to the most typical duration, as indicated by the summary statistics. The duration of neighbouring education categories is also taken into account so as to differentiate them from each other in terms of duration if this seemed reasonable. It is indeed very difficult to standardise this process in a rigorous way.

Separately for each country and ESS round, each outcome variable is regressed on educational attainment as measured in six different ways:[112]

1. The CSEV included in the ESS, used as a benchmark (Model 1);[113]
2. the corrected six-category version of ISCED 97 where ISCED levels 5 and 6 are collapsed (Model 2);
3. the CASMIN education scheme with eight categories (1a, 1b, 1c, 2a, 2b, 2c, 3a, 3b, Model 3);
4. the ES-ISCED with seven categories as proposed in Section 6.3 (Model 4);

112 It was not tried to combine the categorical and metric measures in one model. Firstly, this would probably lead to multi-collinearity, and secondly, the case numbers in the ESS are rather low in quite a few countries.

113 FI, IS and SI used response categories that supposedly directly correspond to the cross-national variable (which actually was not the case in the two latter countries, revealing some danger in the use of input-harmonisation, see Section 5.2.3) and thus did not provide CSEVs, as did TR. For these countries, the variable *edulvl* replaces the missing CSEVs.

5. *actual years of education*, denoted as 'a-years' (Model 5);
6. *hypothetical* years of education, derived from the CSEVs, denoted as 'h-years' (Model 6).

Respondents who indicated that their main activity in the last week was education are excluded from the analyses. Additionally, the same age restriction (25-64) as in all previous analyses is applied. Age and sex are controlled for. With the exception of both types of *years of education*, the education variables are included in the models as dummy variables, i. e. no *a priori* assumption on ordinality or linearity of the relationship between educational attainment and occupational status or social class is made.

The amount of and cross-national differences in the change of predictive power introduced by harmonising CSEVs or using *years of education* instead of a categorical scheme can be shown by a comparison of model fit measures for these regression models. Firstly, the adjusted R^2s resulting from the regressions of the criterion variable on educational attainment are compared across measures of educational attainment within countries. Secondly, it will be evaluated if potential differences in explanatory power between measures differ over countries. As the amount of change of explanatory power might be influenced by the absolute level of association, the *relative* change in adjusted R^2s is computed: The adjusted R^2s from the regression of the respective criterion variable on the levels-only ISCED 97, CASMIN, ES-ISCED and both types of *years of education* are divided by the adjusted R^2s resulting from the regression of ISEI scores on the CSEVs. In this way it can be determined how well harmonised measures represent the institutional arrangements in the different countries and cross-nationally.

7.3 PREDICTING OCCUPATIONAL STATUS ATTAINMENT

The first set of construct validation analyses examines how well different cross-national education variables predict an individual's occupational status, as compared to the CSEVs. This is measured using ISEI scores (Ganzeboom et al., 1992) and implemented using Ganzeboom's coding routines (2005a). ISEI scores are derived from data on current or last occupation, coded in the International Standard Classification of Occupations (ISCO 88). These codes are often available in survey micro data, though at different levels of detail. The ESS contains full four-digit ISCO 88 codes for respondents' current or last occupation for all countries. For these analyses, the sample has to be restricted to respondents for whom data on current or last occupation (coded in ISCO 88) are not missing.[114]

The fact that ISEI scores are a quasi-continuous measure means that firstly, simple OLS regressions and R^2s can be used. Secondly, the interpretation is relatively straightforward; and thirdly, sample sizes are less of a problem than with a categorical construct validation variable.

Table 7.1 shows the case numbers entering the regression analysis in each country per ESS round, the number of categories of the CSEVs and the R^2s from regressing ISEI scores on educational attainment as measured by the CSEVs (model 1), ISCED 97 with six categories (model 2), CASMIN (model 3), ES-ISCED (model 4), *hypothetical years of education* (model 5) and *actual years of education* (model 6). Whereas for model 1 absolute adjusted R^2s are reported, for all other models adjusted R^2s in percent of the adjusted R^2 in model 1 are shown.

114 The southern European countries show rather high levels of missing data on the ISCO 88 variable. The results for TR need to be treated with extra caution since only half of the sample is left after cases with missing information on ISCO 88 are deleted.

TABLE 7.1: Construct validation using ISEI scores

Country	ESS round	N	k	adj. R^2	relative adjusted R^2				
				CSEV	ISCED	CASMIN	ES-ISCED	h-years	a-years
AT	1	1483	5	22.4	.	.	.	99.2	93.3
AT	2	1354	6	36.1	.	.	.	91.2	81.2
AT	3	1470	6	31.8	.	.	.	89.4	67.7
BE	1	1093	11	42.9	90.1	96.8	99.5	90.8	63.0
BE	2	1100	11	43.8	88.0	98.4	96.9	85.9	52.0
BE	3	1101	11	43.6	85.3	100.0	98.7	89.4	52.6
BG	3	806	6	53.0	100.0	.	.	86.8	96.8
CH	1	1359	15	32.5	84.9	94.2	92.9	93.5	61.7
CH	2	1448	15	32.5	69.3	93.8	93.5	96.7	61.0
CH	3	1206	13	48.9	77.3	94.2	98.3	97.8	72.8
CY	3	623	6	46.5	83.0	.	.	80.0	88.4
CZ	1	786	11	48.2	69.4	99.9	95.6	85.6	72.3
CZ	2	1721	11	51.3	69.2	96.9	96.3	86.8	80.1
DE	1	1841	17	42.3	56.4	96.4	93.0	90.7	75.0
DE	2	1756	17	44.3	70.8	95.5	97.1	96.9	72.0
DE	3	1788	18	44.9	68.6	94.0	93.8	91.9	66.5
DK	1	987	10	32.8	79.7	92.5	98.7	87.5	90.3
DK	2	967	9	41.6	79.5	97.0	100.2	85.3	67.6
DK	3	974	9	44.1	83.4	97.9	100.2	92.8	43.8
EE	2	1175	12	34.3	83.4	.	96.9	94.8	95.6
EE	3	876	15	33.7	79.0	87.4	96.1	92.4	91.2
ES	1	817	14	51.6	92.9	99.2	96.8	94.0	75.2
ES	2	832	17	39.5	84.4	97.1	97.5	92.9	77.0
ES	3	1092	17	44.1	82.8	98.8	97.2	86.7	69.6
FI	1	1237	6	35.1	94.6	.	.	80.5	96.7
FI	2	1247	6	37.4	92.4	.	.	88.8	97.8
FI	3	1145	6	38.5	95.1	.	.	87.4	83.0
FR	1	894	11	39.6	82.1	100.2	.	92.4	73.4
FR	2	1129	11	38.9	81.8	98.7	.	93.2	76.3
FR	3	1329	12	42.7	76.0	97.7	96.8	90.5	68.0
GR	1	1249	7	55.9	95.2	.	.	90.9	80.4
GR	2	1266	7	43.9	92.3	.	.	94.5	82.9
HU	1	1040	11	50.9	81.5	100.2	99.7	92.4	78.7
HU	2	980	14	57.9	78.4	97.0	98.9	91.4	69.5
HU	3	908	14	54.7	85.0	94.5	99.0	90.8	88.0
IE	1	1265	7	38.8	.	.	.	96.6	73.0
IE	2	1428	7	36.4	.	.	.	94.9	67.2
IE	3	1043	7	36.4	.	.	.	93.6	73.9
IL	1	1268	14	33.7	75.2	99.3	99.5	97.1	97.1
IS	2	319	6	29.2	72.8	.	.	76.8	54.1

Continued on the next page

TABLE 7.1: Construct validation using ISEI scores

Country	ESS round	N	k	adj. R^2	relative adjusted R^2				
				CSEV	ISCED	CASMIN	ES-ISCED	h-years	a-years
IT	1	689	7	43.3	95.4	.	.	99.0	89.5
IT	2	803	8	46.2	95.9	.	.	97.1	84.1
LU	1	786	19	43.7	84.2	93.5	94.4	90.6	79.6
LU	2	1046	19	51.4	80.2	90.6	92.8	81.9	61.7
NL	1	1620	13	34.2	88.3	99.7	92.2	91.9	62.8
NL	2	1276	13	34.8	87.3	98.5	94.2	91.1	68.0
NL	3	1286	13	36.3	92.2	93.9	94.3	95.1	60.4
NO	1	1223	9	32.4	90.7	.	.	95.7	93.6
NO	2	1205	8	31.5	81.7	.	.	92.8	82.8
NO	3	1163	8	31.0	81.9	.	.	93.4	69.6
PL	1	1266	10	54.0	76.4	97.6	99.2	93.8	92.2
PL	2	1072	8	45.0	87.7	98.8	100.1	95.9	90.6
PL	3	1031	8	49.8	85.3	97.9	99.9	94.0	90.7
PT	1	870	8	44.4	96.2	.	.	97.7	95.5
PT	2	1053	8	46.3	97.1	.	.	96.3	96.5
PT	3	1236	10	53.2	96.0	.	.	96.0	91.9
RU	3	1371	12	47.3	58.6	99.2	98.8	89.2	80.8
SE	1	1266	12	39.2	79.2	90.8	.	94.4	84.5
SE	2	1212	12	41.8	83.9	94.4	.	93.3	83.9
SE	3	1186	13	35.0	83.9	92.9	.	90.2	85.8
SI	1	914	7	52.9	83.7	.	100.0	93.0	85.9
SI	2	699	7	58.4	83.4	.	100.0	94.0	69.6
SI	3	844	7	52.7	80.7	.	100.0	92.3	81.8
SK	2	851	8	40.8	78.9	.	99.5	90.8	59.8
SK	3	1015	8	46.7	84.3	.	99.3	92.5	60.5
TR	2	657	6	49.0	100.1	.	.	88.7	88.8
UA	2	1134	7	43.8	57.1	.	.	96.0	73.4
UA	3	1120	7	45.9	59.6	.	.	93.7	46.5
UK	1	1303	8	32.1	79.3	.	.	96.6	75.5
UK	2	1070	7	33.7	.	.	.	94.7	54.9
UK	3	1473	7	25.8	68.6	.	.	91.6	74.9

Source: European Social Survey 2002-2007, own calculations. Respondents aged 25-64. Weighted using the design weight (*dweight*).
Notes:
'N'=number of valid cases;
'k'=number of categories in the CSEV.
Model 1: absolute adjusted R^2s resulting from regressing ISEI scores on the CSEVs.
Models 2-6: relative adjusted R^2s from regressing ISEI scores on ISCED, CASMIN, ES-ISCED, theoretical and actual *years of education* (relative to Model 1).

Predictive power of the CSEVs (model 1)

Let us first have a look at the results with reference to the CSEV (model 1). The average variance in ISEI scores explained by the CSEVs amounts to 42 % (not shown). There is a large degree of variation across countries, with R^2s ranging from 22.4 to 58.4 %. High R^2s in model 1 mean that there is a high association between educational attainment and occupational status in a country. Relatively low R^2s using the CSEV do however *not* necessarily imply that education is less important for occupational attainment in the respective country. It could equally well mean that the CSEV is strongly affected by measurement error, that it has a low degree of validity e. g. because it does not differentiate all relevant education categories (aggregation error), or that occupational status was not well coded in the ISCO 88.

The highest R^2s (upper quartile) are estimated for BG, CH in round three, CZ, ES round one, GR round one, HU, LU round two, PL rounds one and three, PT round three, SI and TR. Apart from BG, GR, SI and TR, the CSEVs in these countries distinguish at least 10 categories. In those four countries the CSEVs either work really well (because the national educational qualifications are really less diverse), or the actual association between educational attainment and occupational status is even higher than estimated here: In BG, SI and TR, the CSEVs do not differentiate vocational and general upper secondary education, and the CSEV in SI and TR lower and upper tier higher education (college and university). For GR it was already mentioned in Section 5.1.4 that TVET is not sufficiently covered. The country-specific measures for educational attainment in the ESS must still be assumed to produce rather conservative estimates for those countries where the CSEV is not sufficiently detailed. The R^2s for the UK are e. g. below the ones reported by Kerckhoff et al. (2002),

and the CSEV for the UK does not distinguish general and vocational education.

In the case of EE, IL and NL, it rather looks as if educational attainment is really less important for occupational status attainment than in most other countries, as the respective CSEVs are relatively detailed (13 to 15 categories), and still the R^2s from regressing ISEI on educational attainment are comparatively low. In CH in the first two rounds (15 categories) also lie in the lowest quartile of the distribution of R^2s. However, for CH, the association is substantially higher in round three, no matter if educational attainment is measured by the detailed CSEV (or the measures derived thereof) or *actual years of education*. It thus cannot be the CSEV (alone) that improved in round three in CH. Therefore, in substantive terms, only EE, IL and NL can be regarded as countries with comparatively low levels of association between educational attainment and occupational status. However the low associations can also be due to problems in the coding of ISCO 88 and, subsequently, the ISEI.

For those countries that changed their CSEV between rounds, there is a clear improvement for AT, CH and DK and a somewhat less clear improvement for FR, whereas in PL, ES and SE the measured association between ISEI scores and education actually decreased after the national instrument was changed. DK used one category less in 2004 than in 2002, but the discriminatory power of the CSEV improved substantially, probably because the wording of the response categories was improved. In ES, discriminatory power substantially decreased despite the addition of three categories. Maybe the new categories in the Spanish questionnaire were too difficult to use for the respondents and interviewers—there were seven response categories covering no to lower secondary education. However, the explanatory power of *years of education* however also decreased considerably. Like in the case of CH mentioned

above, lacking measurement reliability of occupation or sample characteristics might be responsible for this, rather than the education measures. The changes are not substantial for EE, HU and IT. Finally, there are noticeable changes across ESS rounds in the predictive power of the CSEVs that cannot be explained by changes in education measures (GR, LU, SI, SK). Again, either characteristics of the sample or changes in the coding of occupations might be responsible for this.

Maybe the number of response categories in the CSEV (column *n of cat's*) can be used as a proxy for the quality of the country-specific measure? Particularly worrying in this regard are the CSEVs for AT, BG, CY, FI, GR, IE, IS, IT (2002), SI, TR, UA and the UK (2004)—all being no more or even less detailed than the intended seven-level ISCED variable. The rather low associations with ISEI-scores in some of these countries are probably due to low validity of the CSEVs to some degree, since the variables do not well represent the full range of educational qualifications in the respective countries. Even though the R^2s are relatively high in some of these countries, they could still be underestimated. For IT, PT (2002 and 2004), SK and the UK (2002 and 2006) it does not look much better, as only eight national categories are distinguished, and vocational qualifications are again not always differentiated from general ones.

The correlation between the number of categories of the CSEV, k, and the explanatory power of the CSEV when explaining ISEI scores is however very low with of $r = 0.12$ (n.s.). Therefore, unless even the relatively high associations between educational attainment and ISEI scores in e. g. BG, GR and TR are still underestimated, less detailed measures do not seem to be *necessarily* bad at predicting occupational status: the CSEVs in BG, GR round one,

SI and TR have only six or seven categories and nevertheless produce associations in the highest quartile of the distribution of R^2s. Therefore, there is probably no such thing as *the optimal* number of response categories in a country-specific education variable. The *substantive choice* of categories is more important than the sheer number of categories. This can for example be shown by the fact that there is a substantial and statistically significant correlation between the explanatory power of the CSEV and the fact that it distinguishes some kind of vocational post-secondary education from university education ($r = 0.43$ across ESS rounds). AT, EE round one, FI, IS, SK, TR and the UK do not have such a distinction in their CSEVs in the ESS.

Another quality criterion of the data could be the response rate in a specific country and ESS round. There is indeed an—albeit weak and statistically not significant—correlation between the response rate and the explanatory power of the CSEV of $r = 0.17$.

Performance of ISCED (model 2)

Harmonising the CSEVs into the levels-only ISCED variable collapsing ISCED levels 5 and 6 (model 2) leads to a visible attenuation of the measured association between occupational status and education in nearly all countries. On average, the six-level version of the levels-only ISCED 97 explains 35.4 % (as opposed to 42.9 % using the CSEV) of the variance of ISEI scores, with values ranging from 17.7 to 53.2 % (as opposed to 25.8 to 58.4 %).[115]

The attenuation in model 2 is strongest for CH round two, CZ, DE, IL, IS, RU, UA and the UK round three, where ISCED with six categories explains 75 % or less of the variation in ISEI scores than the respective CSEV. It is weakest

115 Whenever comparing models in this and the following sections, minimum, mean and maximum are re-calculated for the (reduced) sample of country/ESS round combinations for which the model could be calculated. Summary statistics are also given in Table 7.2.

in BE round one, BG, ES round one, FI, GR, IT, NL round three, NO round one, PT and TR. In all these countries but BE, NL, NO and ES, this could be attributed to the rather crude CSEVs with only six to eight categories, which means that harmonisation does hardly entail any collapsing of categories. In fact most of these countries (including NO, again excluding BE, NL and ES), vocational and general education at ISCED level 3 are not distinguished in the CSEVs. In BG, where the country-specific and cross-national variables are identical, and TR, where only one marginal national category (postgraduate degree, two cases) was merged with another more common one (university and college degree), the explanatory power of the CSEV and ISCED is the same.[116] For TR, this led to an inconsequential increase of the adjusted R^2; the non-adjusted R^2 is identical in models 1 and 2 ($R^2 = 49.6$). It was already argued above that in these cases the CSEV is not differentiated enough to allow any conclusions about the effect of collapsing the CSEV into ISCED.

It could be argued that some countries omitted the distinction between vocational and general education because it is not very relevant in their countries, rather than because the ESS organisers did not ask for it. This is implausible though given the degree of differentiation of the ISCED mappings (Eurostat, 2005) along the vocational/general line for BG, FI, GR, IT, PT and TR, showing substantial enrolments in both general and vocational upper secondary education. Country experts also describe upper secondary education in these countries as stratified along the vocational/general line (Barone and Schizzerotto, 2008; Karakaşoğlu, 2007; Kilpi, 2008; Kostova, 2008a,b; Sousa and Fino, 2007; Xochellis and Kesidou, 2007). Sometimes this differentiation can take place within upper secondary education institutions. The school

116 The questionnaire item and source variable are more detailed for TR, but the source variable was not delivered to NSD.

leaving certificate might then be the same for general and vocational studies, but the type of curriculum followed would usually be indicated, which could be picked up by the measurement instruments.

For BE, ES and NL, the conclusion that the relatively low losses of explanatory power are due to undifferentiated CSEVs is implausible since the national measures consist of more than ten categories and distinguish vocational and general education at all levels of education where this distinction applies. However, the loss of explanatory power is low only in one ESS round in these countries and higher than 10 % in the others. Therefore, it cannot be said that in these countries using ISCED does *not* have a negative impact on explanatory power.

The loss of explanatory power correlates moderately and statistically significantly with the number of categories of the CSEVs k ($r = -0.30$), which supports the hypotheses put forward by Kerckhoff and Dylan (1999, p. 769), that "the greater the diversity of the indigenous credentials, the more heterogeneous the standard categories are bound to be, and the more they will underestimate the association between educational attainment and other variables." The relative adjusted R^2s also correlate moderately and statistically significantly with the existence of the distinction of vocational and general education at ISCED level 3 in the CSEVs ($r = -0.33$). This in turn supports the conclusions drawn from the examination of Table B.5, namely that ISCED level 3, including vocational and general programmes, which are usually employment-preparatory and university-preparatory programmes respectively, is too heterogenous to be collapsed into one international category.

The rank-correlation between the adjusted R^2s from the CSEVs and ISCED (6) is $\rho = 0.82$. Although this is of course a relatively high degree of association, it is not quite high enough for a valid comparable measure. Since we deal

with two measures that should measure the same 'thing', ρ should in fact be as close to 1 as possible, so that the harmonised variable reproduces the ordering of countries with respect to the strength of education effects. However, the six-level ISCED variable produces artifactual results for those countries where it does not well represent the country-specific distribution of educational attainment, so that the ordering of countries is not maintained. As an example, whereas the association between educational attainment and occupational status is quite high in RU using the CSEV ($R^2 = 47.3$), it is considerably lower using ISCED ($R^2 = 27.7$). To give a less extreme example, the respective values for BE round two are $R^2 = 43.8$ using the CSEV and $R^2 = 38.6$ using ISCED. More examples could be given here: The problem is not one of a few outlier countries.

Performance of CASMIN (model 3)

The explanatory power of the CASMIN education scheme lies much closer to the original CSEVs. The mean R^2s are 43.1 % for the CSEVs and 41.5 % for CASMIN, so that the difference on average amounts to a mere 1.6 percentage points. Whereas the R^2s range from 32.5 to 57.9 % for the CSEV for those country/ESS round combinations for which CASMIN could be coded, the respective R^2s of the CASMIN model range from 29.5 to 56.2 %. These differences are much smaller than the ones resulting from using ISCED. In relative terms, the CASMIN scheme explains on average 96.4 % of the variation in ISEI scores that the CSEVs explain, with a range from 87.4 to 100.2 %.[117]

117 Relative adjusted R^2s of more than 100 % come about through the fact that we are dealing with *adjusted* R^2s which penalise the number of categories in the educational attainment variable. Since cross-national variables usually have less categories than the CSEVs, if explanatory power does not suffer from the collapsing of categories, this will show up as a relative adjusted R^2 above 100.

Therefore, there is not a single country in which the predictive power of CASMIN as compared to the CSEV drops to 75 % or lower, as was found for ISCED. In fact the highest loss of explanatory power can be observed for EE with a relative adjusted R^2 of 87.4 %. This could be due to the fact that CASMIN is not ideally implemented for EE, since there is no 'authoritative' mapping of the Estonian educational qualifications to CASMIN available. Especially the fact that CASMIN categories 2a and 2b are empty for EE and several upper secondary vocational/professional courses leading to a matriculation certificate exist could make the application of CASMIN problematic. Still, even in the Estonian case, CASMIN works much better than ISCED, which showed a relative adjusted R^2 of only 79 %. In fact, of all countries that could be considered here, there is not a single one in which ISCED has a higher explanatory power than CASMIN.

In a substantial number of countries and ESS rounds (BE, CZ, DE rounds one and two, DK rounds two and three, ES, FR, HU rounds one and two, IL, NL rounds one and two, PL and RU), the relative adjusted R^2 exceeds 95 %. For ISCED, this only happened in countries that had to be excluded from the CASMIN analyses because their CSEVs were too crude, so there was 'not much to lose'.

The relative explanatory power of the CASMIN scheme is negatively and statistically significantly related to the number of categories in the CSEVs: The more categories a CSEV has, the lower the relative adjusted R^2 resulting from regressing ISEI scores on educational attainment ($r = -0.41$). Thus what applies to ISCED is also valid for CASMIN, namely that the explanatory power of the harmonised education variable gets worse the more differentiated the CSEV. But in contrast to ISCED, the relative adjusted R^2 of CASMIN is not associated with the existence of a distinction of vocational and general upper

secondary or tertiary education any more, which is expected since these dimensions are reflected in CASMIN and those countries that did not use these distinctions in their CSEVs could not be coded into CASMIN.

Finally, and importantly, the rank correlation between the adjusted R^2 when regressing occupational status on the CSEVs on the one hand and CASMIN on the other is $\rho = 0.98$, thus considerably higher than the correlation reported above for ISCED, which is $\rho = 0.81$ when only countries and ESS rounds for which CASMIN could be coded are taken into account.

Performance of the ES-ISCED (model 4)

How does the proposed ES-ISCED (model 4) compare with the country-specific measures of educational attainment and the levels-only ISCED 97 and CASMIN? For all countries included in model 4, ES-ISCED is superior to levels-only version of ISCED 97. The explanatory power of ES-ISCED is indeed very close or even identical to the explanatory power of the CSEVs, even if a number of country-specific categories need to be aggregated (see e. g. HU, IL and ES). On average, for all countries and ESS rounds for which ES-ISCED could be coded, the predictive power of the CSEVs is 44.3 %. Using ES-ISCED, it is on average 43.2 %, thus only 1.1 percentage points lower. The ranges are also very similar, with 32.5 to 58.4 % for the CSEV and 30.2 to 58.4 % for ES-ISCED. In relative terms, the average explanatory power of ES-ISCED amounts to 97.3 % of the explanatory power of the CSEVs, and ranges from 92.2 to 100.2 %. In a few cases (DK rounds two and three, PL round two), the adjusted R^2 is thus slightly higher in model 4 than in model 1 since the number of categories used is lower without any loss of explanatory power.

There is not a single country where the relative adjusted R^2 is below 90 %, and LU and NL are the only countries where the predictive power of ES-ISCED consistently lies below 95 %. CH and DE also show lower values of the relative adjusted R^2 in two ESS rounds. In these four countries, tracking at the lower secondary level of education plays an important role in the later life chances of individuals, which is not reflected in ES-ISCED. The reason is that the distinction of different school types and school leaving certificates at the end of ISCED level 2 is irrelevant in most countries nowadays (see footnote on page 230). Since CSEVs do not cover other kinds of differentiation within lower secondary education (e. g. streaming within otherwise comprehensive schools or grade point average of the lower secondary school leaving certificate), such a distinction cannot be implemented for a wider range of countries. This is therefore a point where comparability must remain restricted because of the actual institutional differences across countries.

For model 4, the association between the amount of loss of explanatory power and the number of categories k in the CSEVs is even higher than reported for ISCED or CASMIN before: $r = -0.70$. There is no correlation with the existence of separate categories for vocational education at ISCED levels 3 or 5. However, in this case the association between the loss of explanatory power and the response rate in the respective country and ESS round is highly significant and relatively strong ($r = 0.56$). Using ES-ISCED, it seems that the remaining impediments to further harmonisation can be identified as 1. specificities in a country's educational institutions that are not found in most other countries and are thus 'lost in harmonisation', and 2. attenuation of the association between educational attainment and occupational status due to lower response rates.

Finally, examining the rank correlation between the relative adjusted R^2 when using the CSEVs and ES-ISCED, ES-ISCED shows with $\rho = 0.98$ the same relative explanatory power as CASMIN. Re-calculating the same association for ISCED but only those countries for which ES-ISCED can be coded, the association is $\rho = 0.85$.

Performance of hypothetical years of education *(model 5)*

Now let's turn to the pseudo-metric cross-national measures of educational attainment, *hypothetical years of education* as derived from the CSEVs (model 5) and *actual years of education* (model 6, see the next subsection). Because these measures are treated as interval level variables, the fact that adjusted R^2s are used should give them quite a good chance to compare favourably with the rather non-parsimonious categorical variables. Since *hypothetical years of education* were coded for all countries, no matter if the CSEV put educational qualifications that take differing amounts of time to complete together in one category, the results can be compared for the full sample of countries and ESS rounds again.

On average, *hypothetical years of education* explain only 3.5 % less variation in ISEI scores than the CSEVs (38.5 as compared to 42 %). The range of adjusted R^2s is between 22.2 and 54.8 % when *hypothetical years of education* are used (22.4 to 58.4 % using the CSEVs). In relative terms, *hypothetical years of education* on average explain 91.9 % of the variation in ISEI scores that the CSEVs explain, and the range across countries and ESS rounds is 76.8 to 99.2 %. Therefore, in terms of these summary statistics, *hypothetical years of education* compare quite favourably to ISCED which shows lower levels of explanatory power throughout. In only seven country/ESS round combinations ISCED works better than *hypothetical years of education*: BE round two, BG, CY, FI, GR

round one, PT round two and TR. However, both CASMIN and ES-ISCED seem to be preferable because they don't show any outliers with very low explanatory power. Only in CH rounds two and three, DE round two, EE and NL round three and SE round one, *hypothetical years of education* have a higher explanatory power than CASMIN. Comparing *hypothetical years of education* and ES-ISCED, only in CH rounds one and two and NL round three the relative adjusted R^2 is higher for *hypothetical years of education* than for ES-ISCED.

In fact *hypothetical years of education* do not seem to work well at all in IS, where they only explain 76.8 % of the variation in ISEI scores. In 16 other country/ESS round combinations (AT round three, BE rounds two and three, CY, CZ, DK rounds one and two, ES round three, FI, LU round two, RU and TR), the relative adjusted R^2s when regressing occupational status on *hypothetical years of education* also lie below 90 % of the R^2s when regressing on the CSEVs.

In other countries and ESS rounds, *hypothetical years of education* however seem to work quite well, with relative adjusted R^2s above 95 %. These are AT, IE, NO and the UK in round one; DE, IL, PL and UA in round two; NL in round three; IT and PT rounds one and two and CH in rounds two and three. What is remarkable is that only in IT and PT *hypothetical years of education* score consistently high across the ESS rounds. For AT round one the reason is that the explanatory power of the CSEV is very low because it is so undifferentiated. The same could be said with respect to upper secondary education for the Italian and Portuguese CSEVs, which could explain the results for those countries. If vocational and general tracks would have been distinguished in IT and PT, because their theoretical duration is usually the same, we might have found a difference in the explanatory power of the

CSEV and *hypothetical years of education*. Whenever countries summarise educational qualifications of similar theoretical duration in their CSEV although they might differ in terms of their occupational status implications, this will remain undetected here.

The explanatory power of *hypothetical years of education* is not associated with either the number of categories in the CSEVs, the existence or not of distinctions between general and vocational education at levels 3 or 5 or response rates.

The rank correlation between the adjusted R^2s resulting from regressing ISEI scores on *hypothetical years of education* or the CSEVs amounts to $\rho = 0.96$. This is not all too surprising, given *hypothetical years of education* are derived from the CSEV and make more or less full use of the variation contained in that measure.

Performance of actual years of education (model 6)

Turning to *actual years of education* (model 5), as with *hypothetical years of education*, there is no country where *actual years of education* are a better predictor of occupational status than education as measured by the country-specific categorical education variable (i. e. the relative adjusted R^2s are throughout below 100 %). On average, *actual years of education* explain 32.2 % of the variation in ISEI scores; 9.7 % less than the CSEVs. The range of adjusted R^2s using *actual years of education* is 15.8 to 51.3 %, about 7 % below the minimum and maximum adjusted R^2 when using the CSEVs. In relative terms, the loss of explanatory power amounts to more than 50 % in some countries (DK and UA round three). On average, *actual years of education* explain 73 % of the variation in occupational status that CSEVs explain, with a range of 43.8 to

97.8 %. Therefore, the explanatory power of *actual years of education* shows the highest disparities across countries and ESS rounds of all cross-national measures of educational attainment when compared with the explanatory power of the CSEVs.

There is quite a long list of country/ESS round combinations where *actual years of education* explain less than 75 % of the R^2 that the CSEVs explain. Consistently across all ESS rounds where these countries are included these are BE, CH, DE, IE, IS, NL, SK and UA. In AT, DK, IL and NO round one, FI rounds one and two, EE rounds two and three, BG round three, PL and PT in all rounds, *actual years of education* surpass 90 % of the CSEV's R^2.

It can also be noted that there are sometimes large differences in the explanatory power of *years of education* within countries across ESS rounds. In CH for example, the absolute R^2 increases from 19.8 % to 35.6 % between rounds two and three. Also in other countries, changes of 5 to 10 percentage points (upwards and downwards) are not uncommon.

The explanatory power of *actual years of education* is only statistically significantly correlated with the response rate in a country and ESS round ($r = 0.41$): The higher the response rate, the higher the explanatory power of *actual years of education*. Non-response is thus not random with respect to the association between *actual years of education* and occupational status.

More importantly, there are large differences between countries in the adequacy of *years of education* as compared to the CSEV. The difference between the relative explanatory power of *years of education* and the CSEV is largest in BE, CH, DK (2004 and 2006), IS, NL, SK, UA (2006) and the UK (2004), with *years of education* having less than or around 60 % of the explanatory power of the respective CSEV. In many other countries, it is below 75 %. There is

an (albeit rather weak) association ($r = -0.17$) between the number of categories of the CSEV and the relative predictive power of *years of education*: the more differentiated a country-specific measure, the larger its advantage in explaining occupational status compared to *years of education*.

The adjusted R^2s achieved when regressing occupational status on *actual years of education* correlates least with the adjusted R^2s achieved when regressing occupational status on the CSEVs ($\rho = 0.76$).

Comparison of the cross-national measures

Comparing the different measures of educational attainment, the first observation is that no measure consistently reaches the explanatory power of the CSEVs (i. e. the relative adjusted R^2s are in the majority of cases below 100 %). There are however clear differences between the different comparable measures of educational attainment: on average, ES-ISCED comes closest to the explanatory power of the CSEVs, closely followed by CASMIN. Next in line are *hypothetical years of education*. Then, after a substantial gap, follow ISCED and finally *actual years of education*.

In no country, ISCED works better than CASMIN or ES-ISCED. Comparing CASMIN and ES-ISCED, there are 15 country/ESS round combinations where CASMIN shows a higher relative adjusted R^2 than ES-ISCED, and in 17 country/ESS round combinations, it is the other way round. The differences are largest for EE (where ES-ISCED works better by 8.7 percentage points) and NL (where CASMIN works better by 7.6 percentage points). In nine country/ESS round combinations (BE round two, BG, CY, FI, GR, PT round two, TR), ISCED works better than *hypothetical years of education*. These are almost all cases where the CSEVs is very undifferentiated so that the derived *hypothetical years of*

education cannot be expected to be very accurate. In a few cases, *hypothetical years of education* work *better* than CASMIN (CH rounds two and three, DE round two, EE and NL round three, SE round one) and better than ES-ISCED (again CH rounds one and three, NL round three). Comparing *actual years of education* with the other cross-national measures, in 25 country/ESS round combinations, *actual years of education* works better than ISCED, and in 39, it is the other way round. If there was the choice between ISCED main levels and *actual years of education*, no measure could be clearly preferred above the other. Comparing *actual years of education* with CASMIN and ES-ISCED is more conclusive, since only in EE round three, *actual years of education* have a higher explanatory power than CASMIN, and in no country, *actual years of education* have a higher explanatory power than ES-ISCED. Finally, comparing *hypothetical years of education* and *actual years of education*, *actual years of education* work better in only eight country/ESS round combinations (BG, CY, TR, DK round one, EE and PT round two, FI rounds one and two).

The amount of the losses of explanatory power across countries when using cross-national education variables rather than the CSEVs would not be a big problem if the losses were the same for all countries: Although the absolute level of association would be systematically underestimated, the ordering of the countries would remain intact. However, the results show very clearly that the losses of explanatory power a spread unevenly across countries with all cross-national measures of educational attainment. The difference in spread of loss of explanatory power across countries and ESS rounds can be shown more formally by comparing the standard deviations (S.D.s) and Inter-quartile ranges (IQRs) of the relative adjusted R^2s from the five models using cross-national education variables. This is shown, together with other summary statistics like the number of country/ESS round combinations for

TABLE 7.2: Summary statistics of relative R^2s for construct validation using ISEI scores

Variable	Obs.	mean	min	max	IQR	S.D.
Countries for which ISCED could be coded						
ISCED	64	82.5	56.4	100.1	10.5	10.2
h-years	64	91.6	76.8	99.0	4.6	4.5
a-years	64	77.1	43.8	97.8	20.6	13.6
Countries for which CASMIN could be coded						
ISCED	37	80.0	56.4	92.9	8.6	8.3
CASMIN	37	96.4	87.4	100.2	4.6	3.1
h-years	37	91.5	81.9	97.8	3.5	3.6
a-years	37	73.9	43.8	97.1	17.5	12.5
Countries for which ES-ISCED could be coded						
ISCED	38	80.0	56.4	92.9	8.6	8.2
ES-ISCED	38	97.3	92.2	100.2	3.8	2.5
h-years	38	91.6	81.9	97.8	3.5	3.6
a-years	38	73.3	43.8	97.1	19.0	13.1
Countries for which all variables could be coded						
ISCED	32	79.6	56.4	92.9	9.7	8.9
CASMIN	32	96.5	87.4	100.2	4.6	3.0
ES-ISCED	32	96.9	92.2	100.2	4.7	2.6
h-years	32	91.3	81.9	97.8	4.6	3.8
a-years	32	72.9	43.8	97.1	17.5	13.0

which models can be compared (column 'Obs.'), mean, minimum and maximum relative adjusted R^2s, in Table 7.2. The table is organised in panels in order to restrict comparisons to those country/ESS round combinations for which a specific cross-national education variable could be coded.

For those measures where most country/ESS round combinations can be taken into account (panel 1, only missing AT, IE and the UK round two), *hypothetical years of education* clearly perform best. In the case of ISCED, for some countries and ESS rounds nearly 45 % of the original explanatory power of educational attainment is lost through harmonisation, but for other countries and ESS rounds, 100 % of the explanatory power is retained. Even if the latter will be largely due to crude CSEVs that do not imply any collapsing of categories when harmonised into ISCED, the large amount of variation across countries in the adequacy of ISCED is the *main* threat to cross-national

comparability when using ISCED. For *actual years of education* it looks even worse: the average loss of explanatory power as well as the degree of dispersion of the losses across country/ESS round combinations are higher than for ISCED. In contrast, *hypothetical years of education* perform much better than both ISCED and *actual years of education*. The average loss of R^2 is less than 10 %, and the maximum loss just less than 25 %. The spread across countries of the loss of explanatory power when using *hypothetical years of education* is also much lower than for both ISCED and *actual years of education*.

CASMIN however compares even more favourably to all these three cross-national education variables (panel 2). The average loss of R^2 is less than 5 %, and the maximum loss less than 15 %. Given the lower losses in R^2 when using CASMIN compared to ISCED, the differences across countries in these losses are also smaller than those occurring when regressing ISEI scores on ISCED. The dispersion of losses across country/ESS round combinations is slightly lower than that of *hypothetical years of education* when looking at the S.D., but slightly higher when looking at the IQR.

Turning to panel 3 and ES-ISCED, the results are basically the same as for CASMIN. However, the maximal loss of explanatory power is even below 10 %. Comparing CASMIN and ES-ISCED (panel 4), both measures fare pretty similar, with slight advantages for ES-ISCED.

To summarise, the loss of explanatory power that comes about by using ISCED instead of the CSEVs is more uneven across countries than the loss of explanatory power when using CASMIN or ES-ISCED. This holds for both the IQR and the standard deviation, and the differences are quite large. *Hypothetical years of education* lie somewhere in between ISCED and CASMIN/ES-ISCED, although closer to the latter on all summary statistic. The only instance

where *hypothetical years of education* fare slightly better than any other measure is the dispersion of losses in explanatory power across countries/ESS rounds when looking at the IQR for the restricted samples. *Actual years of education* are even worse than ISCED in terms of the spread of loss of explanatory power across countries and ESS rounds.

7.4 PREDICTING SOCIAL CLASS ATTAINMENT

Social class attainment is chosen as the next variable for the construct validation. In the Weberian tradition, social class at the most basic level refers to the position in society that individuals occupy as a consequence of the employment relationship through which people earn their living, e. g. as dependent workers, self-employed or businessmen. These employment relationships are based on physical capital (assets) as well as human capital (skills), which determine individuals' market capacity. Although the precise meaning and measurement of social class is contested (see e. g. Grusky and Weeden, 2001; Hout and Hauser, 1992; Kingston, 2000), it proves to be an important aspect of people's life chances and life-styles and therefore continues to be a core analytical construct in sociological research (Saunders, 2001).

The respondents' social class membership is measured using the Erikson-Goldthorpe-Portocarero social class scheme (Erikson and Goldthorpe, 1992; Erikson et al., 1979), which was originally developed for Britain by Goldthorpe (1980) and adopted for cross-national social mobility research in the CASMIN project. Erikson-Goldthorpe-Portocarero social class scheme (EGP) classes are a well-established and the most widely used tool for measuring social class in cross-national research (see e. g. Brauns et al., 2000; Breen et al., 2009; Erikson and Goldthorpe, 1992; Ganzeboom et al., 1989; Marks, 2005).

The class schema first of all distinguishes employers, self-employed and employees. Within these categories, further distinctions are made, especially in the large group of employees that is quite heterogeneous with respect to the individuals' labour market and work situations. The main distinction there concerns the nature of the employment contract between the employee and the employer: a labour contract ('money for effort') on the one hand and a service contract ('compensation for a longer-term commitment') on the other. There are however 'intermediate' types of contracts that mix elements of the service and labour relationship. The EGP scheme distinguishes the following eleven class categories:

I Large employers and higher grade; professionals, higher technical, administrative and managerial employees;

II Lower grade professionals, higher technical , administrative and managerial employees;

IIIa Higher grade routine non-manual employees;

IIIb Lower grade routine non-manual employees;

IVa Small employers in industry;

IVb Self-employed workers in industry;

IVc Small employers and self-employed workers in agriculture;

V Lower technical and manual supervisory employees;

VI Skilled manual workers in industry;

VIIa Non-skilled manual workers in industry;

VIIb Non-skilled manual workers in agriculture.[118]

Since EGP classes are a categorical measure and no natural ordering is assumed here, multinomial logistic regression models are estimated. The

118 The distinguishing features of the different class categories cannot be discussed here in any more detail. The coding routine was provided by Leiulfsrud et al. (2005), which builds on Harry Ganzeboom's coding tools (Ganzeboom, 2005a). Classes IIIa and IIIb; IVa, IVb and IVc as well as VIIa and VIIb were aggregated, so that an seven-class version is used here, as in Breen and Jonsson (2000).

amount of and cross-national differences in the loss of predictive power introduced by harmonising CSEVs is shown by a twofold comparison of model fit:

Firstly, McFadden's pseudo-R^2s resulting from the regressions of EGP classes on six different educational attainment measures are described and then compared across education measures within countries. McFadden's pseudo-R^2 (or likelihood-ratio index) can be interpreted as a measure of proportional reduction in error (which in maximum likelihood estimation procedures is given by the $-2*$log-likelihood or 'deviance' statistic), just as the OLS-R^2 can be interpreted as the proportional reduction in the error sum of squares (Menard, 2000, p. 19–20). Pseudo-R^2 is calculated as unity minus the ratio between the log-likelihood of the less constrained model with predictors ($ln(L_M)$) and the log-likelihood of the empty constrained model ($ln(L_0)$):

$$\text{pseudo } R^2 = 1 - ln(L_M)/ln(L_0) \tag{7.1}$$

Pseudo R^2 lies between 0 and 1 for nominal dependent variables (although it never actually reaches 1), and higher values signify a higher reduction in error and vice versa. As with the ISEI analyses in the previous section, adjusted R^2s will be used here in order to account for the fact that the different education variables consist of differing numbers of categories. Since the dependent variable is categorical with seven categories, the models estimated in this section contain a substantially higher number of parameters than the models in the previous section using ISEI scores: The number of degrees of freedom for any EGP model will be *six times* lower than for the respective model in Section 7.3. This means that the adjustment for lacking parsimony will in fact be stronger in these models than in the ISEI models, and the inter-

val level variables based on years of education are expected to benefit from this fact.

Secondly, as with the prediction of occupational status attainment in 7.3, it will be evaluated if these losses in explanatory power differ across countries, and if differently so for different cross-national measures of educational attainment. In order to avoid repetition, the description of the results will be more concise than in the previous section.

Table 7.3 shows the results of the analysis in the same fashion as in Table 7.1, but showing adjusted pseudo-R^2s from regressing social class on educational attainment.

Predictive power of the CSEVs (model 1)

Looking at model 1, the association between educational attainment and social class as measured by the EGP scheme is throughout lower than the association between educational attainment and occupational status as measured by ISEI scores. Modelling social class attainment as an outcome of the CSEVs decreases the log-likelihood of the 'empty' models by 8.5 to 24.7 %, with an average of 15.9 %.

Again the lowest R^2s are often reached in those cases where the CSEV is not very detailed, such as AT, CY, IS, TR and the UK. CH rounds one and two, ES round two, EE and NL however also fall in the lowest quartile of adjusted R^2s. Like with respect to ISEI scores, the R^2 of the CSEV increases substantially in round three for CH. The response rate in CH increases substantially in round two, so this cannot explain the change in round three; and since the explanatory power of *actual years of education* also increases in round three, the change in the CSEV cannot be the only explanation either. For ES, there

TABLE 7.3: Construct validation using EGP classes

Country	ESS round	N	k	adj. R^2	relative adjusted R^2				
				CSEV	ISCED	CASMIN	ES-ISCED	h-years	a-years
AT	1	1485	5	10.4	.	.	.	99.3	90.4
AT	2	1358	6	12.1	.	.	.	87.2	81.7
AT	3	1474	6	12.0	.	.	.	80.9	69.0
BE	1	1094	11	16.3	90.2	97.2	101.6	89.8	65.9
BE	2	1104	11	14.8	92.7	101.2	100.1	90.8	65.6
BE	3	1113	11	15.1	88.2	103.9	103.5	94.7	54.8
BG	3	809	6	19.1	100.0	.	.	97.4	100.0
CH	1	1368	15	14.0	94.1	100.2	99.2	98.1	71.4
CH	2	1451	15	13.8	85.7	99.6	96.4	101.9	67.3
CH	3	1209	13	18.1	83.2	100.5	99.6	100.4	83.1
CY	3	623	6	13.7	87.3	.	.	106.6	102.0
CZ	1	787	11	19.8	63.6	101.4	96.0	95.1	76.5
CZ	2	1728	11	21.2	60.1	98.0	96.1	88.9	75.0
DE	1	1843	17	17.6	77.1	98.9	94.2	98.8	85.7
DE	2	1759	17	17.5	.	97.4	99.8	92.4	72.6
DE	3	1798	18	19.2	78.2	97.2	96.2	92.9	76.4
DK	1	987	10	17.9	93.9	100.8	102.6	94.3	91.8
DK	2	970	9	16.4	84.7	98.8	101.8	90.9	73.9
DK	3	977	9	19.7	89.4	99.7	102.9	98.7	54.7
EE	2	1178	12	12.9	94.7	.	99.8	107.7	116.3
EE	3	879	15	11.0	95.3	108.3	109.1	115.1	114.0
ES	1	820	14	16.4	103.2	107.4	104.9	109.6	89.6
ES	2	846	17	9.1	103.9	111.2	114.1	123.8	105.8
ES	3	1092	17	14.6	94.7	106.1	102.7	98.4	86.4
FI	1	1249	6	15.9	99.6	.	.	95.1	98.6
FI	2	1258	6	16.7	97.1	.	.	97.4	101.3
FI	3	1163	6	17.2	97.9	.	.	93.7	89.5
FR	1	914	11	15.7	84.0	103.1	.	94.6	83.8
FR	2	1139	11	16.6	87.1	101.0	.	100.4	85.3
FR	3	1344	12	19.0	80.2	99.6	94.5	92.6	77.3
GR	1	1257	7	17.6	97.0	.	.	99.0	90.6
GR	2	1266	7	15.6	95.2	.	.	96.4	85.6
HU	1	1040	11	20.2	81.1	105.5	103.3	101.2	82.9
HU	2	980	14	24.7	71.8	96.1	97.4	93.6	68.9
HU	3	921	14	21.4	91.5	104.0	107.4	106.0	97.5
IE	1	1265	7	16.4	.	.	.	99.3	81.2
IE	2	1428	7	16.8	.	.	.	99.3	80.3
IE	3	1043	7	15.1	.	.	.	100.8	91.1
IL	1	1275	14	14.4	92.2	101.7	105.6	102.8	108.1
IS	2	320	6	8.5	77.1	.	.	89.9	76.8

Continued on the next page

TABLE 7.3: Construct validation using EGP classes

Country	ESS round	N	k	adj. R^2	relative adjusted R^2				
				CSEV	ISCED	CASMIN	ES-ISCED	h-years	a-years
IT	1	689	7	11.7	102.9	.	.	108.3	104.0
IT	2	804	8	16.5	100.1	.	.	100.1	87.7
LU	1	798	19	15.6	104.9	108.9	112.1	112.1	99.9
LU	2	1046	19	19.3	88.4	97.0	99.8	88.8	71.7
NL	1	1643	13	14.1	90.0	96.7	94.0	93.5	66.2
NL	2	1290	13	13.4	95.5	100.2	101.0	102.8	78.7
NL	3	1293	13	12.7	102.1	97.4	102.6	106.5	75.5
NO	1	1242	9	14.6	97.9	.	.	99.6	98.9
NO	2	1208	8	16.2	95.3	.	.	99.4	86.1
NO	3	1170	8	17.1	91.6	.	.	98.6	74.9
PL	1	1269	10	17.2	77.6	100.4	102.8	96.3	94.5
PL	2	1078	8	15.2	85.5	99.9	99.5	100.0	98.1
PL	3	1040	8	16.7	80.1	99.5	99.9	94.5	93.3
PT	1	870	8	14.8	103.0	.	.	104.4	102.6
PT	2	1059	8	14.3	101.8	.	.	105.3	106.1
PT	3	1236	10	16.5	98.8	.	.	102.0	92.7
RU	3	1380	12	17.4	72.8	102.0	101.2	107.3	93.1
SE	1	1279	12	16.9	88.5	95.9	.	102.8	91.9
SE	2	1220	12	16.8	89.0	97.3	.	98.6	87.4
SE	3	1198	13	15.2	91.8	100.0	.	99.5	91.0
SI	1	920	7	17.0	77.2	.	100.0	92.6	83.8
SI	2	699	7	18.9	71.7	.	100.0	95.8	68.7
SI	3	845	7	17.6	73.9	.	100.0	93.0	79.1
SK	2	858	8	14.1	69.3	101.5	101.5	92.0	68.4
SK	3	1028	8	16.3	77.0	103.0	103.0	98.8	66.8
TR	2	661	6	14.0	103.8	.	.	103.1	99.1
UA	2	1134	7	16.2	71.8	.	.	97.8	80.3
UA	3	1126	7	17.7	73.0	.	.	96.4	68.1
UK	1	1304	8	13.9	87.0	.	.	100.5	85.4
UK	2	1073	7	13.8	.	.	.	98.4	72.5
UK	3	1473	7	12.9	87.2	.	.	96.7	83.3

Source: European Social Survey 2002-2007, own calculations. Respondents aged 25-64. Weighted using the design weight (*dweight*).
Notes:
'N'=number of valid cases;
'k'=number of categories in the CSEV.
Model 1: absolute adjusted Pseudo R^2s resulting from regressing EGP classes on the CSEVs.
Models 2-6: relative adjusted Pseudo-R^2s from regressing EGP classes on ISCED, CASMIN, ES-ISCED, hypothetical and actual *years of education* (relative to Model 1).

is also fluctuation over ESS rounds, so that we would not want to conclude that these low R^2s are adequate representations of the relationship between educational and social class attainment in ES. Again EE and NL are left as

the only countries where the low degree of association may be representing a real cross-country difference, or problems with the coding of ISCO 88.

The highest pseudo-R^2s are recorded for BG, CH round three, CZ, DE and DK rounds one and three, FR and UA round three, GR round one, HU, LU round two, and SI rounds two and three. BG, GR, SI and UA use rather simple CSEVs, whereas the other countries use more differentiated measures. For AT, CH, FR, HU and PT we see a clear improvement in the predictive power of educational attainment that goes along with a change in the measurement instrument. For DK, ES, PL and SE, the explanatory power rather goes down, and it remains relatively stable for the UK despite the lacking consideration of vocational education and training in round two.

In contrast to the low correlation between the explanatory power of the CSEVs and the number of categories in the CSEVs when predicting ISEI scores, when examining EGP classes the correlation amounts to $r = 0.45$. The more differentiated a CSEV, the higher its capacity to explain social class attainment. The existence of a distinction between general and vocational educational attainment categories at ISCED levels 3 and 5 in the CSEV also correlates with the predictive power of the CSEVs ($r = 0.30$ and $r = 0.49$ respectively). The general/vocational divide is thus more important for the analysis of social class attainment than for occupational status, which is not surprising given the different conceptual approaches of the two concepts: Whereas occupational status is a unidimensional concept that only represents hierarchical differences, social classes are differentiated from each other in substantive ways. For the attainment of some classes (especially for classes I and II, i. e. the service class), general and academic education is important, whereas for others (especially skilled manual workers and technical occupations), vocational training and experience are more important.

Performance of ISCED (model 2)

Like in the previous section, we observe a consistent decrease of the explanatory power of educational attainment when using ISCED rather than the CSEVs.[119] On average, ISCED decreases the deviance by 14.1 %. It is 16.1 % using the CSEVs and restricting the sample to those countries for which ISCED could be coded, a difference of 2 percentage points. The range of pseudo-R^2s is 6.6 to 19.5 as opposed to 8.5 to 24.7 %.

The attenuation is strongest in CZ, HU round two, RU, SI rounds two and three, SK round two and UA—all Central and Eastern European countries (relative pseudo-R^2s below 75 %). As we had seen in Section 6.2, large proportions of the population in these countries complete at least upper secondary education, and the differentiation of general and vocational education is quite strong in these countries, often even adding a third, 'professional' branch.

In 20 country/ESS round combinations however the relative explanatory power of ISCED is 95 % of the pseudo-R^2s of the CSEVs or higher, among which again a number of countries with crude CSEVs (BG, FI, GR, IT, NO, PT, TR).

As with the ISEI models, the loss of explanatory power is significantly related to the existence of a distinction of vocational from general education at the upper secondary level ($r = -0.29$). The rank correlation of the pseudo-R^2s of models one and two is $\rho = 0.70$, which is again too low for models that should be as similar as possible.

119 For DE round two, ISCED levels 0 and 1 had to be collapsed in order for the model to converge. Since there were only two cases in level 0 this will probably not have any effect on the results.

Performance of CASMIN (model 3)

The CASMIN education scheme shows on average more or less identical adjusted pseudo-R^2s as the CSEVs. In some cases however, the relative adjusted R^2 even exceeds 100 %. This is due to 1. the fact that coding educational attainment in CASMIN does not lead to a substantial loss in explanatory power and 2. CASMIN has less categories (here: 8) than the average CSEV. For categorical dependent variables, punishing lack of parsimony of the independent variable(s) by using adjusted R^2 has stronger effects than for continuous dependent variables. This means that for those countries, CASMIN could actually be used as the analytic coding scheme for educational attainment also for country-specific studies in order to facilitate post-hoc comparisons of results. The range of pseudo-R^2s achieved using CASMIN is very similar to the range achieved using the CSEVs, albeit slightly smaller (10.1 to 23.8 as compared to 9.1 to 24.7 %).

Again, there is no country/ESS round combination where CASMIN reaches less than 90 % of the reduction in deviance of the CSEV, and in 37 combinations the relative adjusted pseudo R^2 exceeds 95 %. The correlation between the adjusted pseudo-R^2s of models 1 and 3 amounts to $\rho = 0.98$, which is rather satisfactory.

Performance of the ES-ISCED (model 4)

The results for ES-ISCED are basically the same as those for CASMIN: the same average explanatory power as the CSEVs and a slightly smaller range in pseudo-R^2s than model 1, no country/ESS round combination with less than 90 % relative adjusted pseudo R^2, and 35 with 95 % or more. The correlation between the R^2s of model 1 and 4 is $\rho = 0.97$.

Performance of hypothetical years of education *(model 5)*

Hypothetical years of education also show a relatively high explanatory power. The reduction in average explanatory power is, with 0.3 percentage points, negligible (the average *relative* adjusted R^2 is 98.6 %), and the range of pseudo-R^2s is again slightly lower than the one achieved with the CSEVs, as with CASMIN and ES-ISCED.

In six country/ESS round comparisons however, the relative adjusted R^2s lie below 90 % when using *hypothetical years of education*. Again, there is a moderate association between the number of categories in the original CSEV and the relative adjusted pseudo R^2s in model 5 ($r = 0.27$). The association of the R^2s from models 1 and 5 amounts to $\rho = 93.2$, slightly below the values achieved by both CASMIN and ES-ISCED.

Performance of actual years of education *(model 6)*

Like with the ISEI analyses, *actual years of education* perform relatively poorly. The average relative adjusted pseudo R^2 is 13.4 rather than 15.9 (a drop of 2.5 percentage points), with the range being 6.5 to 20.8 rather than 8.5 to 24.7.

In 19 country/ESS round combinations, the relative adjusted R^2 in model 6 is below 75 %, and in 26 it lies above 90 %. Like with the ISEI models, the relative adjusted pseudo R^2 of model 6 is related to the response rate ($r = 0.28$). The association between the adjusted pseudo R^2s of models 1 and 6 is only $\rho = 0.63$.

Comparison of the cross-national measures

Comparing the five cross-national measures, let's first of all look at how they compare within countries. Only in NL round three, ISCED works better than CASMIN, the same result as from the analyses of ISEI. In all other countries and ESS rounds, CASMIN has a higher relative adjusted pseudo R^2. ES-ISCED is however superior to ISCED in all cases. *Hypothetical years of education* have a lower relative adjusted R^2 than ISCED in only six country/ESS round combinations. In the majority of countries/ESS rounds, ISCED has a higher relative adjusted R^2 than *actual years of education*.

Comparing CASMIN and the other measures, there are 17 country/ESS round combinations where CASMIN outperforms ES-ISCED. The largest difference occurs for NL round one, where CASMIN achieves a 8 percentage point higher relative adjusted pseudo R^2. In twelve country/ESS round combinations, *hypothetical years of education* work better than CASMIN, and in the same number (though only partly the same cases) better than ES-ISCED. *Actual years of education* only have a higher explanatory power than CASMIN in EE round three (which was already flagged a few times for low performance when using CASMIN), and IL.

For the comparison of ES-ISCED and *actual years of education*, it looks pretty similar, and both rounds for EE as well as IL are the only cases where *actual years of education* have a higher explanatory power. Finally, comparing *hypothetical years of education* and *actual years of education*, there are six country/ESS round combinations where *hypothetical years of education* have a lower explanatory power than *actual years of education*.

Table 7.4 summarises the mean and variation of the relative explanatory power of the different cross-national education measures across countries

TABLE 7.4: Summary statistics for construct validation using EGP classes

Variable	Obs.	mean	min	max	IQR	S.D.
Countries for which ISCED could be coded						
ISCED	63	88.3	60.1	104.9	16.8	10.9
h-years	63	99.1	88.8	123.8	8.2	6.6
a-years	63	85.4	54.7	116.3	22.6	14.0
Countries for which CASMIN could be coded						
ISCED	37	86.9	60.1	104.9	11.5	10.1
CASMIN	37	101.3	95.9	111.2	4.2	3.7
h-years	37	99.2	88.8	123.8	9.2	7.6
a-years	37	82.6	54.7	114.0	19.2	14.0
Countries for which ES-ISCED could be coded						
ISCED	38	85.2	60.1	104.9	16.7	11.0
ES-ISCED	38	101.2	94.0	114.1	3.4	4.4
h-years	38	98.8	88.8	123.8	9.8	7.8
a-years	38	81.6	54.7	116.3	24.1	15.3
Countries for which all variables could be coded						
ISCED	31	86.8	60.1	104.9	14.0	11.0
CASMIN	31	101.7	96.1	111.2	4.5	3.8
ES-ISCED	31	101.4	94.0	114.1	5.9	4.9
h-years	31	99.4	88.8	123.8	9.2	8.2
a-years	31	82.0	54.7	114.0	18.4	15.1

and ESS rounds as Table 7.2 did for the construct validation using ISEI scores. As before the relative R^2s are adjusted for the number of categories of the respective variable. Again, the different panels report these statistics for different subsamples of countries and ESS rounds, depending on the possibility to code the respective education variable.

The results are overall very similar to the ones reported on pages 266 to 270: the ordering of the different cross-national measures in terms of performance relative to the CSEVs does not change at all. *Actual years of education* show the highest losses of explanatory power as well as the highest variation of these losses across countries/ESS rounds. ISCED is a little bit better, but still fits countries in too different ways as to produce comparable results. Hypothetical years of education, CASMIN as well as ES-ISCED in contrast show rather high levels of relative adjusted R^2 and low degrees of variation

therein. Comparing these three measures, CASMIN and ES-ISCED are clearly superior to *hypothetical years of education*, especially because the minimum relative adjusted R^2s lie much closer to 100 %, which positively impacts on the variation (both IQR and S.D.) of the categorical measures. The rather low minimum for *hypothetical years of education* is not a single outlier, as a closer look at Table 7.3 reveals.

7.5 CONCLUSIONS ON THE INFORMATION CONTENT OF DIFFERENT CROSS-NATIONAL MEASURES OF EDUCATIONAL ATTAINMENT

Whereas Part II has focused on ISCED exclusively, in this part of the study, the performance of ISCED is compared with other cross-national measures of educational attainment. In Chapter 6, by analysing the dispersion of the CSEVs and the categorical cross-national educational attainment measures ISCED and CASMIN, it became clear that the information content of ISCED is much lower than the information content of both the CSEVs used as a benchmark and CASMIN as an alternative cross-national categorical coding scheme. Thereby it became clear that important distinctions between educational attainment categories in many countries are not well captured by the levels-only ISCED 97, and an alternative simplification of ISCED (ES-ISCED) was proposed.

This chapter investigated the consequences of this loss of information for concrete comparative analyses, using occupational status and social class attainment as outcome variables for the construct validation. Two popular *metric* measures of educational attainment that are supposed to be cross-nationally comparable were added to these analyses: *hypothetical* and *actual years of education*.

The results show that there is a lot of variation across countries in terms of the adequacy of the levels-only ISCED 97 and *actual years of education*. Although the measurement quality of the CSEVs is sometimes dubious, it is clear that neither ISCED nor *actual years of education* are satisfactory cross-national measures of educational attainment. This is most visible for countries with stratified educational systems, which often use relatively detailed CSEVs. *Actual years of education* are probably an unsuitable measure of educational attainment as the relationship between the actual time spent in the educational system and output like education certificates or skills is not as close as one might think. In fact, individuals with lower ability levels might take longer to achieve the same formal certificate or the same skill level as individuals with high ability levels. On the other hand, able and motivated individuals tend to stay in education longer, too. Some people also spend significant amounts of time in education without gaining any certificate at all (e. g. university dropouts). Thus *actual years of education* are conceptually and empirically no good measure of educational attainment (neither for cross-national research nor for studies focussing on a single country).

Overall it seems as if ISCED is most problematic for Central and Eastern European countries, probably because the reduced version of ISCED 97 does not differentiate general from vocational qualifications—a distinction which is essential in these countries. This was already suspected when looking at the distributions of the levels-only ISCED 97 in the different countries (see Table B.5).

Using the ISCED scheme, cross-national differences in the effects of education inadequately represent real differences across countries and are seriously misleading. As an example, whereas CZ looks like a country with a relatively tight relationship between educational attainment and social class

attainment when using the CSEV (ranking 5th for round one and 3rd for round two out of 64 country/ESS round combinations), when using ISCED, it rather looks as if education and social class attainment are comparatively loosely connected (CZ ranking 52nd for round one and 49th for round two, again out of 64).

CASMIN and the ES-ISCED are more differentiated in this respect, and consequently perform much better on average than *both* the levels-only versions of ISCED 97 and *years of education*, and the variation in the amount of loss of explanatory power across countries is also less pronounced. The explanatory power of the CASMIN scheme and the conceptually similar ES-ISCED come relatively close to the explanatory power of the country-specific representations of educational attainment. When comparing the ranking of CZ using ES-ISCED (and thus restricting the sample of country/ESS combinations to 38) rather than ISCED, CZ comes out 5th and 3rd using the CSEV and 7th and 4th using ES-ISCED.

Since *hypothetical years of education* reflect different educational qualifications by using different values for qualifications in terms of how long it would theoretically take to complete them, this measure is also more differentiated than ISCED. It however does not capture qualitative differences between qualifications that take the same time to complete. *Hypothetical years of education* therefore do not achieve the same explanatory power as CASMIN or ES-ISCED, but they are by far not as bad as ISCED or *actual years of education*. Coming back to the example of CZ, when using *hypothetical years of education*, CZ ranks 6th and 5th respectively in terms of the correlation between educational attainment and social class attainment.

Table 7.5 summarises the rank-correlation coefficients of the adjusted R^2s achieved with the cross-national education variables and the CSEVs for both

TABLE 7.5: Spearman's rank correlation coefficients for relative adjusted R^2s achieved with different educational attainment measures

	CSEV	Obs.	ISCED	Obs.	CASMIN	Obs.	ES-ISCED	Obs.	h-years	Obs.
	Using ISEI as construct validation variable									
ISCED	0.82	64	1							
CASMIN	0.98	37	0.81	37	1					
ES-ISCED	0.98	38	0.87	38	0.98	32	1			
h-years	0.97	71	0.81	64	0.94	37	0.97	38	1	
a-years	0.76	71	0.73	64	0.66	37	0.75	38	0.75	71
	Using EGP as construct validation variable									
ISCED	0.61	64	1							
CASMIN	0.98	37	0.65	37	1					
ES-ISCED	0.97	38	0.66	38	0.98	32	1			
h-years	0.93	71	0.64	64	0.95	37	0.93	38	1	
a-years	0.63	71	0.56	64	0.71	37	0.65	38	0.72	71

Source: European Social Survey 2002–2007, own calculations.
Note: Pairwise deletion of observations, i. e. all country/ESS round combinations available for a specific comparison are included (columns 'Obs.'). Although listwise deletion sometimes leads to slightly different results, it does not change the ordering of the measures.

dependent variables, ISEI scores and EGP classes. This summary confirms the conclusions drawn from the summary tables 7.2 and 7.4.

Using CASMIN or ES-ISCED, we can thus be relatively confident that substantial differences across countries in the effects of education are real rather than methodological artefacts due to different amounts of aggregation error in different countries. Thus, not only from the point of view of data consistency by national teams (see Part II), but also from the point of view of information content, the implementation of ISCED 97 in the ESS needs to improve. The fact that ES-ISCED can be related to the ISCED mappings could facilitate future cross-national research in educational stratification. This could reinvigorate the debate on equality of educational opportunity, which is considered worth revisiting from a comparative perspective (Hout and DiPrete, 2006, p. 7).

Since *hypothetical years of education* still fare relatively well, this looks like an attractive alternative for the cross-national measurement of educational at-

tainment when qualitative information on the level and kind of educational certificates is not relevant for a specific piece of research. Still, there are quite a number of countries where this measure does not work particularly well, such as AT, BE, CZ, DE, DK, IS and SI. Also the relative performance of *hypothetical years of education* is substantially better when predicting EGP classes than when predicting ISEI scores, throwing doubt on the universal usefulness of this measure. It should also be kept in mind that this study throughout uses *adjusted* R^2s that should work to the advantage of *hypothetical years of education*, but still CASMIN and ES-ISCED show higher relative adjusted R^2s. The final chapter of this study will discuss the choice between (pseudo-) duration based and credential-based measures of educational attainment further.

A couple of potential objections to these conclusions should be discussed. First of all, the measured association between educational attainment and the chosen outcome is of course also sensitive to the quality of the measurement of the response variable used for the construct validation, here ISEI scores and EGP classes: "whenever one assesses the construct validity of the measure of interest, one is also evaluating simultaneously the construct validity of measures of the other theoretical concepts" (Carmines and Zeller, 1979, p. 25). Because of the four-digit ISCO 88 codes, the measurement of ISEI and EGP can however be assumed to be quite good compared to studies that have to rely on two- or three-digit ISCO 88 codes. Also, information on people's occupations are usually relatively reliable, especially as compared to income data (Hauser and Warren, 1997). The main source of measurement error concerning ISEI scores and EGP classes thus lies in the coding of job descriptions into ISCO 88, which could differ in quality across countries e. g. for reasons of experience with coding such information. However, the purpose of this study is not to substantively compare the actual association of educa-

tional attainment with the outcome variables across countries, but the comparative evaluation of different educational attainment measures. Since the sample as well as the dependent and control variables are the same across models, changes in R^2s across education measures within countries can entirely be attributed to differences between measures of educational attainment. However, if a construct validation variable is inadequately measured in some country, the predictive power even of the CSEV could be underestimated already. Maybe loss of explanatory power would then show up less than if ISEI scores or EGP classes were measured well. This is one of the reasons why the cross-national education measures ideally would be construct validated using a wide range of response variables: Using different response variables, we will most likely find those instances when a specific cross-national education variable does not work well even if in some cases the measurement of the response variable is not optimal.

Secondly, the choice of ISEI scores for construct validation in Chapter 7 could be criticised because socioeconomic indices (SEIs) work differently for men and women: The education-occupation-wage relationship was found to differ across the sexes, and an SEI constructed for for men is a bad substitute for an SEI for women (Hauser and Warren, 1997, p. 219–220). The ISEI however was constructed for men only (Ganzeboom et al., 1992). However, if anything, separate analyses for men would probably only show *more* pronounced effects than the ones shown here. Moreover, EGP classes have been shown to be valid for both men and women alike (Evans, 1996), and the results achieved using EGP classes for the construct validation (Section 7.4) are very similar to the results achieved with ISEI scores (Section 7.3).

Thirdly, a check if the models estimated in this chapter are adequate in terms of not breaking regression assumptions or being influenced by outlier obser-

vations was not within the scope of this study because of the sheer number of analyses performed. Although the results presented here might be problematic in a few instances, it is not to be expected that these problems would reach such a degree so as to invalidate the conclusions.

Finally, since the CSEVs in many countries were insufficient for coding into ES-ISCED (e. g. SE and the UK), there is no evidence yet of how well the ES-ISCED would work in the excluded countries. Therefore, it is possible that ES-ISCED and CASMIN perform well in those countries for which they could be coded, but if the coverage was the same as for ISCED, they would show similar problems, or at least compare less favourably. Indeed a higher degree of variation in the explanatory power of any measure is to be expected with the addition of more countries. However, in order to account for this, the comparison of the different measures was always based on the same sample of country/ESS round combinations, so that bias through different underlying samples can be excluded. In more substantive terms, since CASMIN and ES-ISCED work well for countries with very differentiated educational systems like DE, HU, NL and CH, it is quite probable that they would also work well in the excluded countries, which often do have less differentiated educational systems (and thus CSEVs).

8

LOST IN HARMONISATION, OR PROGRESS IN THE CROSS-NATIONAL MEASUREMENT OF EDUCATIONAL ATTAINMENT?

Although educational attainment is a core variable in social research and of great importance for policy makers and academics alike, the quality of educational attainment data is hardly ever evaluated. This is especially grave for comparative research since educational attainment is one of the concepts the measurement of which is most difficult to harmonise. The aim of this study was therefore to evaluate the measurement of educational attainment in cross-national surveys. For this purpose, the data collection instruments, harmonisation procedures and harmonised educational attainment data in three European surveys were examined in Part II. In Part III, further analyses compared the information content of country-specific education variables (CSEVs) and cross-national measures of educational attainment for one of those surveys.

The results show that the measurement of educational attainment in cross-national surveys is affected by a number of (in principle avoidable) weaknesses which adversely affect the validity of claims based on analyses of these data. These weaknesses can largely be attributed to 1. a lack of standardisation in the data collection instruments and coding routines and 2. a lack of understanding of important dimensions of differentiation of educational attainment by data collection organisers. This final chapter synthesises

and discusses the results of the study and puts forward some ideas so as to overcome these problems.

8.1 SYNTHESIS AND DISCUSSION OF RESULTS

Educational attainment is one of the few concepts that cannot be harmonised by input harmonisation, i. e. by using the same (thus 'merely' translated) data collection instrument in all countries, because educational systems and their outputs differ a lot across countries. Therefore, countries use their specific data collection instruments for educational attainment in cross-national surveys, and the resulting variables are recoded into a cross-national scheme, e. g. the ISCED 97, with some basic instructions from the survey organisers. This seems to go along with the perception that more cannot be done for achieving cross-nationally comparable data on educational attainment.

This study has however shown that the devil often lies in the detail and that there are in fact a number of ways in which the *standardisation of the country specific measures of educational attainment and the harmonisation process across countries* could be increased so that more comparable cross-national measures could be achieved. The challenge is thus to increase the element of input-harmonisation in the measurement of educational attainment and find a compromise between *country-specific aspects* of measures (e. g. detailed qualification titles in response categories) and *input-harmonised aspects* of measures (e. g. wording of the question itself, overall design of the instrument). This is of course a very difficult task since it might sometimes break nationally accepted customs. However, it is argued here that country-specific measures might themselves actually *benefit* from close scrutiny and recommendations for the purposes of improving the cross-national measurement of educational attainment since quite often they fail to impress.

Furthermore, the information content of some cross-national educational attainment measures *and* CSEVs is not very high and does not allow capturing important dimensions of differentiation in educational attainment. This point is related to the lack of conceptual clarity when designing educational attainment measures rather than technical issues. In this respect it is fair to say that "the main problems are not technical but theoretical" (Scheuch, 2000, p. 73, emphasis added).

8.1.1 *Inconsistent choice of indicators of 'educational attainment'*

To begin with, the underlying concept of 'educational attainment' can be understood and operationalised in different ways. This becomes evident when comparing the specific question wordings and response categories of the educational attainment questionnaire items across surveys and countries (see Chapter 5). Whereas most countries operationalise educational attainment via educational certificates obtained and thus endorse a 'signalling device' understanding of educational attainment, other countries do not focus their measures around educational certificates but more general notions of 'level attained' or 'grades completed'. The EU-LFS, closely followed by EU-SILC, contains the most standardised education data in this respect. The binding character of EU regulations is an advantage in this respect. The ESS organisers in contrast did not specify a definition and operationalisation of educational attainment to be used, which leads to more heterogeneous indicators used in the national questionnaires. However, a clear concept and definition of educational attainment and operational guidelines for its measurement, thus facilitating equivalence of content validity, are the very first condition of comparable measurement.

Lack of standardisation in the underlying concept and operationalisation also applies to the coverage of sectors of educational systems, such as technical and vocational education and training (TVET), or continuing/adult education. For example, if some countries include qualifications attained in continuing education and training and others don't, the resulting data will be less comparable than they could be: In the latter group of countries, educational attainment will be underestimated if substantial numbers of people achieve qualifications in continuing education and training.

Finding a definition and operationalisation of educational attainment that suits countries around the world (or even within Europe) is quite a challenge though since countries differ with respect to the relevance of specific educational careers, certificates, non-formal education, TVET, and so on. While the EUROSTAT surveys define educational attainment as *the highest level of education an individual successfully completed* and restricts this definition to formal education, it is still not quite clear which exact indicator is to be used in data collection instruments.[120] Solely relying on 'educational certificates achieved' does not allow capturing non-negligible amounts of uncertified education, such as several years of university studies without achievement of an academic degree. It also ignores different pathways taken for the achievement of the same certificate, especially 'standard' paths and 'non-standard/second chance' paths. Finally, the acquisition of educational certificates itself is of unequal importance for labour market success in different countries. Drop-out categories are thus excluded from the EUROSTAT definition of educational attainment, non-standard paths subsumed under

120 Work in this area is ongoing amongst the international organisations involved in the current review of the ISCED 97. A definition of educational attainment and operational guidelines to its measurement will be included in the recommendations to be put forward with a revised version of ISCED at the UNESCO 2011 general conference.

the highest educational certificate obtained, and the definition is probably most adequate for countries with pronounced 'credentialism'.

Moreover, an educational programme could be successfully completed without a certificate being awarded, which is common at the primary level of education. This would be covered by the above definition of educational attainment, but many countries do not make a distinction between 'no education' and 'only primary education' amongst respondents who have not achieved the lowest possible school certificate. Although it is probably irrelevant in today's educational systems in most EU member states, it is not for countries where educational systems expanded rather late (PT, TR) and for specific population groups (e. g. older cohorts, first generation immigrants). Some further implications of choice of concept and operationalisation will be discussed in Section 8.1.4.

8.1.2 *Differing level of detail of national variables*

Next, the level of detail of country-specific data collection instruments varies substantially across countries and surveys. If a country uses only *one very simple questionnaire item with very few response categories* in a survey (no matter if cross-national or not), it is quite probable that distinctions that are important within this country are not adequately reflected. In countries with highly differentiated educational systems and a multitude of educational qualifications, an instrument with only six or seven categories is probably insufficient. Some countries used instruments in the ESS that were supposed to *just* cover the ex-ante specified (levels-only) ISCED 97 (e. g. the UK, SI and FI), which comes very close to input-harmonisation of the response categories. In the Questionnaire Development report, it was however advised against input harmonisation of response categories (Erikson and Jonsson, 2001) since this

entails a loss in precision and because detailed country-specific measures of educational attainment are already available in other surveys for most countries. We therefore need to distinguish between input harmonisation of *questions* and input harmonisation of *response categories*.

An undifferentiated coding structure of CSEVs could lead to systematic errors and biases in analyses based on these data (Groves, 2004, p. 316): If different countries use educational attainment measures that differ in the richness of information, this leads to different estimates of education effects which are not related to any *real* differences, but to differences in the information content and quality of the variables in different countries since more detailed variables might have a higher explanatory power. Moreover, a low level of detail of CSEVs complicates or even prevents the recoding of CSEVs into purpose-built or cross-nationally comparable variables:

> "Perhaps most important of all, the generation of a scheme of classification is only half the job that needs to be done. Any analyst faces problems of how to fit the data to the scheme. This is in part a problem of adequacy of the data. Where information is not detailed enough, the full scheme cannot be realised" (Brynin, 2003, p. 343).

The coding of *hypothetical years of education* or scaling of education will also be less accurate when the original educational attainment categories span many different qualifications.

If some countries use only simple CSEVs, this can lead to very aggregated and heterogeneous (country specific and harmonised) educational attainment categories.[121] This in turn hugely restricts the potential usage and

121 The probability of this happening increases if the comparable scheme is specified ex-ante *and* is not very detailed like e. g. the simplified version of ISCED 97 in the ESS, because then apparently only the coding needs of a crude cross-national classification need to be satisfied by the country-specific instrument. The request from NSD to "use the best possible nationally designed instrument [...] to measure respondents' highest level of education" (Norwegian Social Science Data Services, 2004) was ignored by some national teams. The instruments used in some countries or ESS rounds do not even allow coding into the simplified ISCED (e. g. AT, IE, the UK in round two).

'equivalence of construct validity' of the data: Even if the international categories are nominally comparable, the heterogeneity of the international categories differs substantially across countries, which was shown to invalidate cross-national comparisons based on correlational analyses in Chapter 7. The challenge for instrument development is therefore to maximise information content and 'harmonisability' while minimising the complexity of the questionnaire item.

8.1.3 *Inconsistent implementation of the ISCED 97*

There are different ways in which a cross-national education classification like ISCED 97 can be implemented in actual surveys. Differences in implementation of the ISCED (or any cross-national scheme) can lead to substantial inconsistencies of educational attainment data across countries and surveys. This is especially an issue with respect to the treatment of missing data. For example, should 'illiterate' respondents be coded as 'missing', as in the EU-SILC? Or respondents with unspecified 'other' qualifications as ISCED level 3, as with the UK data for the EU-LFS? The delineation of ISCED levels 2 and 3 is a complex issue, too: Should short vocational upper secondary educational programmes and the resulting qualifications be treated as completed upper secondary education or not? Finally, countries may deal with outdated qualifications in different ways, either assigning them to the ISCED category that they would have been assigned to when they were in operation, or to the ISCED category of their current successor qualifications. Countries also deal with foreign qualifications in different ways.

Different surveys code ISCED in different levels of detail. Although this does not imply inconsistencies across data sources, it determines the usefulness

of the data for research e. g. in terms of which theoretically meaningful distinctions can be drawn. The EU-LFS uses the most detailed scheme, although it still does not differentiate vocational and general education at ISCED level 3. Neither the ESS nor EU-SILC differentiate within ISCED levels, and EU-SILC aggregates ISCED levels 5 and 6 from the outset. The distributions of the levels-only ISCED 97 reveal that the coding scheme chosen by the ESS and EU-SILC co-ordinators is not detailed enough at the upper secondary and tertiary levels of education, with the consequences shown in Chapter 7. Very low levels of education in turn look over-differentiated in most countries.

The cross-nationally comparable variable in the ESS is less detailed than recommended by Erikson and Jonsson (2001), who were consulted as academic specialists on the measurement of social position during the ESS questionnaire development. They suggested to use a less simplified version of ISCED covering ten categories, distinguishing general and vocational education at ISCED levels 2, 3, 4 and 5. Why this proposal was not implemented remains unclear. The distinction between general and vocational qualifications, to be derived from the country-specific instrument, was given the same (highest) priority as measuring levels of education, but the item does not appear in the adopted version of the questionnaire any more. The result is that one of the reasons for using ISCED rather than CASMIN in the first place, namely greater flexibility and a higher degree of differentiation, was compromised during the implementation process.

Regarding the actual harmonisation process, it was found that especially in the ESS, country-specific education categories were not coded into ISCED 97 using the ISCED mappings but rather by 'face equivalence', leading to pronounced inconsistencies in the application of ISCED across countries. The

resulting 'harmonised' educational attainment variable in the ESS is therefore not cross-nationally comparable. Since the ESS data sets include the CSEVs, this could however be spotted and rectified. Such a validation is not possible for the EU-LFS and EU-SILC.

Since the application of a cross-national classification is also necessary for the measurement of individuals' *occupation*, it is fruitful to briefly look at how occupations are measured in cross-national surveys using ISCO 88. For the coding of occupations, it is standard to use open questions on people's job characteristics and post-code these using indices of industries and occupations and related dictionaries (see e. g. Ganzeboom, 2005b). Erikson and Jonsson (2001) thus initially recommended to collect educational attainment data for the ESS with an open question on the highest educational qualification achieved and the awarding institution. This information subsequently was to be coded into ISCED 97 (p. 27). This was deemed too resource intensive for the ESS, which is acceptable. What is *not* acceptable though is the lacking provision of available information resources for the harmonisation of educational attainment data (mainly the ISCED mappings), which happened especially in the first two rounds of the ESS. To continue the above analogy, this is as if coders classified occupational information into ISCO 88 off the top of their heads. As Hauser and Warren (1997) put it for the coding of occupations, the quest for a simple solution like sight-coding of basic occupational information "reflects a casual attitude toward socioeconomic measurement that probably would not be tolerated by the same investigators if it pertained to their major substantive interests" (p. 186, footnote 8). Since the ISCED mappings are by far less extensive than listings of occupations for coding e. g. ISCO 88, a consultation of the ISCED mappings should not be too

much to ask, given the importance of educational attainment as explanatory, control and response variable.

In support of the ESS organisers it must however also be said that despite the UNESCO's and EURYDICE's efforts,[122] the development of systematic indices, dictionaries and coding tools for education related information hugely lags behind the respective resources for the coding of occupations.

The ISCED mappings also are not the cure-all and could be improved themselves: They are currently developed by the NSIs without consultation with independent experts. In some cases, assignments of educational qualifications to ISCED categories seem to deviate from the ISCED 97 definitions, possibly for political reasons (see Schneider, 2008c, and the chapters therein). Since this is however not very common, it could be dealt with by asking national teams in the ESS not to stick to the mappings slavishly, but to document and justify any deviations from the official ISCED mappings. This of course requires some active engagement with the classification and the mappings.

8.1.4 *An empirical and conceptual comparison of cross-national education variables*

In Chapter 7, a number of cross-national measures of educational attainment were compared in terms of their explanatory power when predicting social stratification outcomes, namely occupational status and social class attainment. The results of the regression analyses support the findings by Kerckhoff and Dylan (1999), Kerckhoff et al. (2002), Braun and Müller (1997) and Müller and Klein (2008), whereas Ganzeboom and Treiman's assertion

122 EURYDICE is the Information Network on Education in Europe, established by the European Commission and Member States in 1980. See `http://eacea.ec.europa.eu/portal/page/portal/Eurydice`

that "the strong association between education and other variables is usually well preserved under alterations of the coding schemes" (Ganzeboom and Treiman, 1993, p. 474) has to be called into question. Compared to the studies by Kerckhoff, Müller and colleagues, the results presented here are based on a larger number of countries, evaluate ISCED 97 rather than ISCED 78, include two types of measures related to *years of education*, and use a more detailed occupational classification for the coding of occupational status.

Firstly, the levels-only ISCED 97 and *actual years of education* generate quite different results from the CSEVs. Both measures inadequately represent educational attainment in different countries. Both the levels-only ISCED and *actual years of education* ignore differences in the labour-market value of general and vocational education. In addition, *actual years of education* do not capture the effect of educational qualifications, which ISCED is at least in principle capable of.

Secondly, the degree of inadequacy of both measures differs across countries: There is a high degree of variation across countries in how well (or rather how poorly) the levels-only ISCED 97 and *actual years of education* predict occupational attainment, compared to the CSEVs. Substantive conclusions on cross-national differences in the education-occupation association based on either measure would thus be misleading.

This study has thus shown that the common approach to harmonisation of categorical education variables chosen by international organisations, the aggregation of categorical variables into ever more general categories, such as the ISCED main levels or even the three-level version of ISCED, is highly

problematic when studying the outcomes of education.[123] Although a high level of generality and a low number of categories might make educational attainment data more manageable, this comes at the expense of the validity of the data.

This can be explained by the fact that the degree of internal heterogeneity of the aggregated education categories differs a lot across countries. Consequently, the results of studies using such data must be treated with caution: Since the content of the categories differs across countries, especially with respect to the relative importance of vocational and technical qualifications at a specific level, the comparison might not be very meaningful any more. This problem is exacerbated in correlational analyses, where the differential heterogeneity of educational attainment categories across countries may attenuate the relationship between educational attainment and other variables to such a degree that the strength of the relationship cannot be meaningfully compared across countries.

This is not a problem of the ISCED itself though. Despite the ISCED 97 being a detailed international classification of educational programmes, it has not been implemented in the ESS or EU-SILC in a way that reflects important distinctions in peoples' educational attainment in many European countries. Since the ESS and EU-SILC versions of ISCED neither distinguish between vocational and general qualifications nor between qualifications with different destinations within ISCED levels, they contain significantly less information than the CSEVs.

123 Although the three level version of ISCED recommended by EUROSTAT, summarising levels 0 to 2 ('low education'), 3 and 4 ('medium education') and 5 and 6 ('high education') was not included in the construct validation, the conclusions will be the same as for the six-level version, and the precise effects most probably even worse (for the respective results for Germany, see Müller and Klein, 2008).

Also, it was shown in Chapter 7 that there are three alternative measures of educational attainment that do *not* substantially distort the correlations between educational attainment and the outcome variables and differ *less* in the (in)adequacy across countries than the levels-only ISCED 97 or *actual years of education*: Coding CSEVs into either more detailed attainment categories using the CASMIN education scheme or the proposed ES-ISCED, or deriving *hypothetical years of education*. This shows that the way the 'common denominator' for constructing comparable education categories is chosen can have a major impact on the substantive results, and that ISCED 97 *levels* do not exhaust the possibilities for drawing meaningful comparisons.

8.1.4.1 *Years of education vs. categorical measures*

Especially *hypothetical years of education* look like an attractive alternative because they are measured at the interval level and thus in principle allow the application of linear modelling techniques. This measure is therefore usually applied in studies in the tradition of social status attainment research, following Blau and Duncan (1967). Models using *hypothetical years of education* are more parsimonious than models using a categorical measure since fewer parameters have to be estimated, which also in principle facilitates the interpretation of results. The same applies to interval level measures derived from country-specific education categories through optimal scaling.

A few words of caution are however in place. The choice of measure of educational attainment (cross-national or not) should be made "by specifying, for a given project, *why* education is an important independent variable—such as a factor in social mobility, or in the ability to choose between leisure alternatives, or as an element of social distinction in the sense of Bourdieu" (Scheuch, 2000, p. 73, emphasis added). It is argued here that there are only

few applications where *hypothetical years of education* or an optimally scaled variable are preferable to a categorical (and more especially, certificates-based) measure of educational attainment on theoretical grounds.

The critique of *years of education* as a measure of educational attainment goes back at least to the late 1970s when Griliches (1977) concluded that "we shall soon wish to abandon the monolithic concept of schooling and of one human capital and start looking for different decisions and different pay-offs at different levels and for different types of schooling" (p. 17).[124] *Years of education* (in both its 'actual' and 'hypothetical' variants) are conceptually more restricted and less specific than categorical measures of educational attainment. Firstly, using *years of education* in linear regression analyses requires the assumption that every year of schooling has the same impact. This is not always tested, but could be dealt with using more complex model specifications like quadratic terms.

Secondly and more importantly, the use of *years of education* implies a socialisation or investment perspective (Kingston et al., 2003, p. 58-59): *Actual years of education* only reflect the time an individual was exposed to educational institutions. Both *actual* and *hypothetical years of education* do however not capture the 'signalling' aspect of educational certificates or any other output (Brynin, 2003) and is thus unsuitable for testing theories that involve signalling aspects of educational attainment—thus practically all theories that are concerned with labour market and social stratification outcomes. The usage of *years of education* and the respective disregard of formal qualifications when studying labour market outcomes has accordingly been invalidated by research on the 'sheepskin-effect' of educational credentials (e. g. Goodman, 1979b; Hungerford and Solon, 1987; Jaeger and Page, 1996; Park, 1999, also

124 A more recent rather extensive critique can be found in Brynin (2003).

see Section 3.2,) for the US.[125] The results presented in Chapter 7 support this conclusion for Europe although admittedly not all of the CSEVs explicitly capture educational certificates.

Thirdly, *hypothetical years of education* as well as proportionally scaled education variables ignore the multidimensionality of education and press different types of qualifications (and thus skills) into one unidimensional scale. *Years of education* cannot capture differences in the quality of schooling, which impacts on socialisation outcomes over and above the mere duration of exposure to educational institutions: Different educational programmes often cover the same number of cumulative years of schooling, but are qualitatively different from each other in terms of the type of instruction, entrance requirements, intellectual demand, and later payoff (see e. g. Shavit and Müller, 1998).

Although scaled education measures retain the amount of variation inherent in the nationally specific measures, they are not a panacea either: they do not have an inherent metric but 'borrow' it from the criterion variable. Using both *hypothetical years of education* and optimally scaled variables, a researcher is restricted to talking about 'more' or 'less' education, without any further qualification. When using *years of education* as an explanatory variable, the interpretation is usually along the lines of 'one more year of education increases/decreases y by amount b'. But 'one year of education' is not well specified in itself, especially when comparing coefficients across countries and when deriving *hypothetical years of education* for different educational tracks. Therefore, "the ease of interpretation is more apparent than real" (Brynin, 2003, p. 329).

125 Accordingly, the Current Population Survey in the US changed the measure of educational attainment from 'highest grade completed' to a measure combining the duration of schooling and educational certificates in 1992 (Park, 1999).

If signalling through formal qualifications is not an issue, in rather undifferentiated educational systems, like e. g. in the US, *years of education* could be argued to be a meaningful measure of educational attainment: From the end of compulsory schooling on, individuals basically face the decision between staying in the educational system (high school or college) for another year or entering the labour market. This is surely not the case in most European countries (see e.g. Breen, 2004a; Breen and Jonsson, 2000; Brynin, 2003; Gambetta, 1987): most European educational systems are highly differentiated and include qualitatively different, often parallel tracks. But even for the US, the human-capital type conceptualisation of education as a linear accumulation of skills is contested since there is curriculum differentiation of academic and vocational tracks in secondary schools, and there are strong prestige differences between universities (see e. g. Arum and Hout, 1998). Since educational systems have diversified over the last decades, the advantage of qualitative differentiation of categorical educational attainment measures compared to *years of education* will probably also have increased over time.

When ignoring the multidimensionality of educational attainment, especially with respect to sectorial or track differentiation, differences between qualifications attained in different sectors of the educational system or between vocational and general qualifications, which can also differ across countries, cannot be studied explicitly. Categorical schemes can thus probably produce more meaningful results than inductive scales that do not carry any interpretation over and above 'more' or 'less' education, and miss horizontal differentiation as a stratifying factor. Consequently, using *hypothetical years of education* or scaled education variables does not allow linking research results to specific institutions in educational systems and therefore

also does not allow further conclusions that might be relevant to education policy. What is true for socioeconomic measures is again true also for educational attainment measures: "The lack of a clear conceptual rationale has important consequences in limiting the scope for influencing policy" (Rose and Pevalin, 2002, p. 88).

Closely related to the fact that *years of education* are an ill-specified indicator of educational attainment in the first place, *years of education* are only *nominally* comparable across countries by using a superficial standard unit. Although a year is a year is a year, it is unclear what *years of education* actually mean in different countries: "It would be nice if years of education somehow cut through all this complexity to give a clear, uncluttered measure of true achievement that carries no national baggage, but how can it do this if it is unable to convey accurate information even within a national system?" (Brynin, 2003, p. 341).

Finally, when using educational attainment as a dependent variable for analysing inequalities in education *over time*, it was shown by Mare (1981) that linear models regressing *years of education* on social background mix up the effects of structural change (e. g. educational expansion) and change in social stratification processes (e. g. equalisation of access to, say, higher education). This effectively hinders conclusions with respect to change in stratification processes themselves, which are the prime focus of social stratification theories. In turn, when analysing binary educational transitions using logistic regression, the 'pure' effect of social background can be estimated.

Later on, Breen and Jonsson (2000) highlighted that binary transitions from one grade or level of education to the next (with the alternative of leaving the educational system) do, like *years of education*, not reflect the more differentiated, multinomial options available to individuals at specific branching

points in complex educational systems. The decision process rather involves choice between different *kinds* of educational programmes and leaving the educational system.

This very useful conceptualisation of the educational attainment process as a *series of multinomial decisions* highlights an important restriction of the categorical measures employed in all cross-national surveys and evaluated in this study: The approach to analyse only the highest or final level of education achieved "implicitly (and implausibly) assumes that the decision of how much education to acquire is taken at the outset of the individual's educational career" (Breen and Jonsson, 2000, p. 758, see also Pudney, 1989).[126] Educational *careers* are thus crucial in the social stratification process and an important area of research in their own right. There are however currently no cross-national data available to study educational careers from a comparative perspective.

However, although the *highest level of education completed* does not allow a reconstruction of the process of how educational inequalities are generated, it is the concept social stratification research is often more interested in than any specific educational transition when describing *overall* levels educational inequality rather than investigating inequality generating mechanisms (see e. g. Breen et al., 2009, p. 1477).

126 Educational careers are structured in very different ways in different countries and are also not equally important. For FR and DE e. g. it is well-known that not only the highest (often vocational) educational certificate obtained is important, but also the path to it (i. e. the highest general school certificate). It is also quite common in FR that individuals continue to a higher level of education without having attained the school-leaving certificate of the previous level, or to continue beyond an educational certificate without achieving another one (Smith and Garnier, 1987). Lacking separate information for educational programmes merely *attended* and *successfully completed* as well as the sequence between them, it e. g. remains unclear if people from lower social backgrounds do not manage to *enter* specific educational programmes or if they manage to enter but subsequently drop out, or fail final exams. In DE in turn, the specific combination of general school certificate and post-school certificates is highly important for individuals' later lives.

To summarise, although initially a single coefficient for *hypothetical years of education* looks more easily interpretable than a set of coefficients from dummies for a number of education categories, this comes at a high price in terms of comparability and specificity of interpretation.

It can thus be questioned if an a-theoretical measure like *hypothetical years of education* is helpful in furthering knowledge on the causal links between educational attainment and its conditioning and outcome variables. Although categorical measures do not directly tap any micro-level processes themselves and lack information on pathways taken in the educational system, they are more specific in theoretical terms and thus potentially more useful for research that tries to disentangle causalities. The only applications for which *hypothetical years of education* can thus be recommended is when using educational attainment as a control variable only, i. e. when a substantive interpretation of coefficients is not sought and the main concern is to tap the explanatory power of the CSEVs. However, even then, the better relative performance of CASMIN or ES-ISCED could be enough of a reason to prefer those measures over *hypothetical years of education*.

8.1.4.2 *CASMIN vs. ISCED*

What would then be the rationale for using either ISCED 97 (or a measure based thereon such as ES-ISCED) or CASMIN in any actual survey or study? With respect to the choice of classification for the ESS, Erikson and Jonsson (2001, p. 25) argue that ISCED "is more flexible and gives users more degrees of freedom in constructing their preferred measures". The sub-dimensions programme destination and orientation used in ISCED are considered "an attractive feature of the classification because these dimensions capture the dynamic element in the educational career and are sensitive to the labour

market opportunities of students (in the same vein as the CASMIN schema is)" (Erikson and Jonsson, 2001, p. 25). Unfortunately this is only true in principle, since ISCED is currently only implemented in a highly aggregated fashion in the ESS and EU-SILC. The version used in the EU-LFS is only slightly better. To date, there is in practice not much that users can do with this measure to adapt it to their preferences. The flexibility and detail of the classification can thus only be exploited when researchers can post-code highly detailed CSEVs.[127]

In terms of disadvantages of the ISCED, Brynin (2003) states that ISCED is not helpful for measuring educational attainment because it is too much geared towards highly general descriptions of educational systems using administrative data. Indeed, ISCED was not specifically developed for social survey research and facilitating comparative sociological investigations, but rather for statistical reporting, monitoring and information of national educational policy. It is therefore not surprising that it does not always perfectly fit the needs of social scientists doing empirical research.

However, the main restriction lies in the flawed implementation of the ISCED in actual data collection exercises rather than ISCED itself, since most of the advantages Brynin (2003) later mentions for CASMIN equally apply to ISCED if ISCED is implemented in a more *detailed* way (i. e. covering the distinction between vocational and general education rather than just main levels).[128] The only advantages of CASMIN that remain are then that 1. it explicitly classifies educational *qualifications*, whereas ISCED classifies educational *programmes*, and 2. it builds on social-scientific criteria, whereas ISCED is geared

127 As another advantage over ISCED, Erikson and Jonsson (2001) mention that ISCED includes a measure of fields of education. This can however be used independently of the ISCED levels of education.

128 Quite often when people criticise ISCED (e. g. Hoffmeyer-Zlotnik and Warner, 2005; Körner and Meyer, 2005) they in fact rather criticise the implementation of ISCED neglecting the sub-dimension 'programme orientation' rather than the classification itself.

to administrative and political needs. With respect to the first point, educational programmes can in most cases be easily linked to the respective certificates awarded upon successful completion of the programme. With respect to the second point, as has been shown by the construction of ES-ISCED in Chapter 6, a scientifically useful scheme can also be constructed from ISCED because the ISCED criteria largely overlap with the 'scientifically interesting ones'. Therefore, if the data is coded with sufficient detail (which is also a requirement for CASMIN), ISCED is a very flexible tool that can be adapted to the analysis of many sociological research questions by further recoding.[129]

Erikson and Jonsson bring up the difficulty of implementation when using ISCED in all its detail. Indeed, as Section 5.2.3 has shown, the lacking consistency across countries in the application of ISCED to national data can be regarded as one of the main problems when measuring educational attainment using the ISCED 97. There is however no reason to assume that CASMIN is more easily implemented: CASMIN has so far only been used for a rather restricted range of countries, whereas ISCED is applied virtually worldwide. In actuality, one of the advantages of ISCED that Erikson and Jonsson only mention in passing is that field organisations might have routines for coding educational attainment into ISCED, but not CASMIN, and that there are more classification instructions available for ISCED. Despite the fact that some documentation is insufficient or missing, ISCED is far more systematically and comprehensively documented than CASMIN. In fact, CASMIN does not provide a "set of rules about how particular qualifications in a country should be coded" (Brynin, 2003, p. 332), and for the future usage of CASMIN

129 For some suggestions on how to improve the structure and definitions of ISCED itself, see Schneider (2008d)

there is a need to formalise the assignment of national educational qualifications to CASMIN categories on a larger scale than achieved so far.

Therefore, especially the availability of the ISCED mappings (of which Erikson and Jonsson and other people writing about ISCED, e. g. Hoffmeyer-Zlotnik and Warner, 2005 were probably unaware) and the provision of an international terminology can thus be regarded as the crucial advantage of ISCED over CASMIN which could positively impact on the comparability of the resulting data. Furthermore, if ISCED was used in all surveys, data resulting from small-scale academic surveys can be validated with the results from large-scale, official surveys, as was performed in this study in Chapter 4. If academic surveys relied on CASMIN, this would not be possible. Finally, the ISCED is developed, documented and maintained by the UNESCO, OECD and also EUROSTAT in consultation with country delegates, so that a considerable degree of organisational expertise and continuity is likely.

In conclusion, while CASMIN might remain a valuable classification for the comparison of those countries for which it has been implemented and used, it can be expected that for large-scale cross-national data collections ISCED will usually be the classification of choice. Finally, whenever international organisations such as OECD and EUROSTAT collect data, they use the ISCED anyway.

8.2 SUGGESTIONS FOR THE MEASUREMENT OF EDUCATIONAL ATTAINMENT IN CROSS-NATIONAL SURVEYS

After summarising the results of this study, the previous section argued that (adequately detailed) categorical measures of educational attainment are preferable over *hypothetical years of education* (or in a similar vein, scaled

composite variables supposed to measure educational attainment) on both conceptual and methodological grounds: They are capable of adequately representing qualitative differences as well as the signalling character of educational qualifications, and when used as a dependent variable, logit modelling ensures that the effects of change in social stratification processes are not conflated by structural change. Furthermore, ISCED 97 is the measure included in official cross-national data, and the resulting availability of documentation concerning ISCED 97 for a wide range of countries might also make it preferable over CASMIN for non-official surveys.

In this section, a number of suggestions will be made to improve the measurement of educational attainment in sample surveys. Whereas many of the suggestions are rather general in nature and would improve the measurement of educational attainment independently of the chosen harmonised coding scheme (and often also apply to single country surveys), others are more specifically geared towards the use of ISCED in cross-national surveys.[130]

8.2.1 *Improving instruments and country-specific education variables*

Cross-nationally harmonised variables cannot be better than the CSEVs they are derived from. This subsection therefore makes suggestions on how to improve CSEVs in order to 1. standardise and improve the information content of the CSEVs itself and 2. ensure that the data can be harmonised into a detailed ISCED scheme.

130 Conceptual and coverage problems of ISCED 97 itself as well as difficulties in the application of ISCED 97 to actual educational qualifications in different countries were treated in Schneider (2008c), and respective suggestions were made in Schneider (2008d). Only those suggestions that derive from this study will be repeated here.

Some of the proposals made in this section might seem too ambitious for general social surveys. They, however, should be considered when educational attainment is not just measured as a background variable but also as a concept of interest in itself, e. g. in the EU-SILC which, although primarily a source of comparable income data, is also used to report on the intergenerational transmission of education in European countries (European Commission, 2008b).[131] Since there is currently no cross-national survey in Europe that is specifically dedicated to the study of educational attainment as well as its antecedents and outcomes, it would be very helpful if such 'ambitious' proposals would be considered for integration in one of the currently existing surveys. Other proposals are however *essential* in order to enable effective harmonisation of educational attainment data in *any* survey.

8.2.1.1 *Development of standard instruments*

First of all, most countries do not have standard instruments for collecting information on respondents' educational attainment. Standard instruments provide question wording and response options as well as interviewing instructions. It would be desirable if such standard (yet flexible) instruments were developed according to the recommendations given in this section and the requirements of core social background variables as given in European Commission (2007).

This would improve not only cross-national harmonisation but also *cross-survey* harmonisation *within* countries (see e. g. Statistisches Bundesamt, 2004, for the German 'demographic standards' that include, among others,

131 See Müller and Klein (2008) who show that the measurement of educational attainment in the EU-SILC is actually of too low quality to allow inferences about cross-national differences in the intergenerational transmission of education across Europe.

citizenship, age, marital status and educational attainment). This recommendation matches the proposal by Hudson (2007) that "the OECD might want to consider proposing a standard education attainment question for each OECD country for use in all international surveys" in order to ensure that ISCED 97 can be coded from the data collected.

8.2.1.2 *Coverage of foreign qualifications*

In times of large-scale migration and student mobility, there are substantial numbers of people in many European countries who achieved their highest educational qualification abroad. CH and LU are examples in place. The fraction of people with foreign qualifications will probably also increase in the future in many countries.

Currently only very few countries (e. g. LU) accommodate for this in a systematic way, whereas most countries seem to assign foreign qualifications to country-specific categories on the basis of 'face equivalence' or use a residual category ('other qualification'). In order to improve and standardise the coverage of foreign qualifications, it would be desirable if foreign qualifications (and the country where they were achieved) were recorded verbatim during the survey interview. They would then have to be post-coded using the ISCED mapping of the country where the qualification was achieved.

8.2.1.3 *Ensuring an adequate level of detail*

Lack of detail of the source variables can be regarded as the root of the problems of achieving high quality country-specific indicators *and* constructing harmonised educational attainment measures that do not overly distort country-specific education effects. If we want to investigate cross-national differences, these have to be measured in the first place.

It therefore cannot be stressed enough that all countries should collect data on educational attainment in a detailed way, covering all educational qualifications occurring among the adult population in a country (thus providing separate response categories for 'outdated' and current educational qualifications). Only this ensures that categories that are comparable across countries *and* over time can be constructed.

Furthermore, national specificities of educational attainment should be considered in the CSEVs even if they are not reflected in harmonised education variables (in as far as the sample size allows). Information that is important to draw further distinctions within the county, such as institutions and educational programmes *attended*, e. g. prestige or elite status of institutions, and maybe even marks achieved should be covered whenever possible. This is important because otherwise we risk to 'harmonise away' those cross-national differences in explanatory variables that might actually account for differences across countries in the outcome. Thereby, country-specific features of educational systems that will get lost in the harmonisation process can be preserved in the *source* data. Later harmonisation should not be taken as a reason to aggregate country-specific categories from the outset. National survey teams should consult with researchers working on educational attainment in their country in order to find out how to best aggregate country-specific categories if this is necessary.

Also, it would be desirable to obtain separate measures for general/academic and vocational/professional education since for some theoretical approaches (e. g. cultural capital theory) general education is of interest mostly, but not vocational education. This would however be very difficult to achieve in many countries where the distinction between the two is not clear-cut.

Finally, it would be very useful if the type of instruction (school based only, combined school-based education and workplace training) would be measured with each vocationally oriented educational programme and the private/public divide with respect to secondary school qualifications (graduation from a fee-paying school) in order to assess the specific signalling value of these qualifications.

However, it cannot be expected that data on all past and current qualifications in a country can be collected in all detail in general social surveys, especially in countries with a large number of qualifications. A feasible compromise on how to aggregate qualifications at the point of data collection must be found. In order to still ensure that the data can be harmonised into the detailed ISCED scheme, whenever the ISCED mappings assign different ISCED (sub-) categories, including programme destination, orientation and duration, to different qualifications, *at least these* have to be distinguished in the CSEVs.

This holds even if some distinction would not make much sense from a national point of view: It could be important on an international scale, since what is conceived as 'equivalent' in one country might not be in another country, or even less so in the ISCED framework. For example, if vocational training is not important in country A, it would probably be acceptable to only collect data on general education certificates for a national study of *this* country. Assume that in country B in turn the differentiation between vocational and general education is highly important in terms of antecedents and outcomes of education. Then, when conducting a cross-national study or collecting data that might be used for cross-national work later on in countries A and B, since leaving out information on vocational education in

country B would misrepresent educational attainment in this country, vocational education needs to be covered in country A, too.

This especially applies to the distinction between ISCED levels 3 and 4 as well as to very low levels of education (i. e. individuals without any certificate) that are currently inconsistently covered and coded across countries. With respect to very low levels of education, coverage could be improved and standardised using a separate questionnaire item on the highest grade completed for respondents who report not to have any formal educational certificates. With respect to the distinction between ISCED levels 3 and 4, some information on educational *careers* is necessary for assessing the *cumulative* amount of education an individual has achieved. Therefore, those aspects of educational careers that are necessary to identify second cycle upper secondary qualifications should be covered in the CSEVs.

Following these rules would lead to data collection instruments containing around 15 to 20 categories (ISCED 0, 1, 2C, 2B, 2Ag, 2Av, 3Cs, 3Cl, 3B, 3Av, 3Ag, 4C, 4B, 4Ag, 4Av, 5B, 5Am, 5Al, 6), depending on which ISCED categories exist in a specific country and which additional country-specific distinctions need to be made. In order to maintain questionnaire items that are manageable for interviewers and respondents, the development of data collection instruments using two questionnaire items (e. g. one for school and one for post-school qualifications like in the German case) and/or multi-item questions using smart filters (like in IE and the UK in EU-SILC and the EU-LFS) could be advisable. This would be facilitated by the fact that more and more countries switch to CAI techniques.[132]

132 For example, the questionnaire could be programmed in such a way that for young respondents, outdated qualifications are not shown, and for older respondents, school qualifications that were only recently introduced remain hidden.

8.2.1.4 *Coverage of uncertified education*

As was discussed in Section 8.1, we need to distinguish conceptually between educational attainment in terms of the highest educational qualification obtained on the one hand and the highest educational programme attended or completed (without certification) on the other hand. The latter concept can be termed 'uncertified education' and captures individuals' educational experience irrespective of the achievement of educational qualifications.

Although educational certificates are the core information for analysing labour market outcomes of education and other outcomes that might be susceptible to signalling, educational programmes attended are important in terms of *access* to education and from a socialisation point of view. The difference between programmes attended and successfully completed would also enable researchers to study drop-out from a cross-national perspective, a topic for which currently no cross-national data are available. Also, even though attendance without certification probably means that skill formation within that programme was not entirely successful, it can be expected that uncertified education increases human capital to some degree. It is e. g. common in the US to distinguish a category for college dropouts ('some college') in national statistics between the high school diploma and Bachelor degrees, which proves to be a useful distinction in terms of individuals' human capital. Kerckhoff et al. (2002) argue that 'some college' becomes a credential although there is no formal certification process because there are so few educational certificates available in the US educational system at this level.

A measure of educational attainment in terms of qualifications obtained is thus only the minimal condition in general social surveys. Because the scope

of topics to be effectively analysed can be increased by including uncertified education, it would be very valuable if all countries additionally collected information on educational programmes attended in a standardised way, which was also proposed by Brauns et al. (2003, p. 243). It also has to be noted that both measures should not be mixed in one source variable as is currently the case in some countries in the ESS because the highest qualification cannot unambiguously be inferred for those categories that contain 'uncertified' levels of education. They can however be usefully combined in an analytic variable at the stage of data analysis.

8.2.1.5 *Basic coverage of educational careers*

Finally, data on individuals' educational careers are currently not available at a cross-national scale. Through a relatively simple design of data collection instruments, there might be a way to collect (basic) data on educational careers without overly consuming survey resources and interviewing time.

- Instead of asking respondents for their highest level of educational attainment only, they could be asked for *all* qualifications they hold. Respondents would thus not tick *one* response category of the questionnaire item, but *all that apply*.
- The same procedure could be applied to all educational programmes respondents attended *without* achieving the respective certificate so as to identify *uncertified education* as proposed above. This could either be achieved by adding a second column of tick boxes to the response categories so that for each education category, respondents indicate 1. if they have attended an educational programme at this level and 2. if they have obtained the respective certificate. Otherwise this could be achieved by using a separate questionnaire item so that both the question as well as

the response categories clearly refer to *programmes attended* for one item and to *qualifications obtained* for the other item.

– A further layer of information on educational *careers* could be gained if the *temporal order* in which qualifications were attained was recorded. As educational careers become less standardised and multiple training episodes are quite common (for DE see Hillmert and Jacob, 2003), and the analysis of educational transitions (Breen and Jonsson, 2000; Mare, 1980) is a very valuable and paradigmatic approach in the analysis of educational opportunity, it would be desirable to collect such information, e. g. by asking for the year in which the respondent achieved a qualification or enrolled in an educational programme.

Figure 8.1 and Figure 8.2 show how such questionnaire items could look like in general terms for both educational programmes attended and educational qualifications obtained. The response categories would have to be 'filled' by the country-specific descriptors of the respective educational programmes and qualifications. The items cover both certified and uncertified education, multiple educational programmes attended and qualifications obtained, as well as the timing of attendance/achievement. Foreign qualifications as well as low levels of achievement are catered for. Figure F.1 and Figure F.2 in the appendix show how the instrument could look like for the German case.

Depending on the overall purpose of the survey, the additional costs of this procedure in terms of interviewing time might be justifiable in light of the increased richness of information. These instruments could increase the scope of research questions that could be tackled enormously, for which otherwise quite specialised data sets are currently required, none of which are cross-national. They would first have to be applied to and tested in a large number of countries of course.

A1 Which of the following *educational programmes* did you attend?
Please tick all that apply and indicate the year in which you left the programme.

0.	None or education received abroad	☐ _____
1.	Programme corresponding to ISCED 1	☐ _____
2.	Programme corresponding to ISCED 2C	☐ _____
3.	Programme corresponding to ISCED 2B	☐ _____
4.	Programme corresponding to ISCED 2Av	☐ _____
5.	Programme corresponding to ISCED 2Ag	☐ _____
6.	Programme corresponding to ISCED 3Cs	☐ _____
7.	An outdated programme corresponding to ISCED 3Cs	☐ _____
8.	Programme corresponding to ISCED 3Cl	☐ _____
9.	Programme corresponding to ISCED 3B	☐ _____
10.	Programme corresponding to ISCED 3Av	☐ _____
11.	Another programme corresponding to ISCED 3Av	☐ _____
12.	Programme corresponding to ISCED 3Ag	☐ _____
13.	Programme corresponding to ISCED 4C	☐ _____
14.	Programme corresponding to ISCED 4B	☐ _____
15.	Programme corresponding to ISCED 4Av	☐ _____
16.	Programme corresponding to ISCED 4Ag	☐ _____
17.	Programme corresponding to ISCED 5B	☐ _____
18.	Programme corresponding to ISCED 5Am	☐ _____
19.	Programme corresponding to ISCED 5Al	☐ _____
20.	Programme corresponding to ISCED 6	☐ _____

A2 If education received abroad:
A2a Please indicate the educational programmes you attended.
☐
A2b In which country did you attend these educational programmes?
☐

FIGURE 8.1: Template for proposed country-specific data collection instruments on educational programmes attended

8.2.2 *Improving coding procedures in cross-national surveys*

For the purpose of measurement of educational attainment in cross-national surveys, it is useful to distinguish three types of variables (also see Rose and Pevalin, 2002, p. 91):

1. *Source variables* directly result from the response elicited by administration of one or more questionnaire items or item batteries (the instrument) to respondents in a survey (e. g. a text string containing the

B1 Which of the following *educational qualifications* did you obtain?
Please mark all that apply and indicate the year in which you achieved the respective qualification.

0.	None or foreign qualification	☐ _____
1.	Qualification corresponding to ISCED 1	☐ _____
2.	Qualification corresponding to ISCED 2C	☐ _____
3.	Qualification corresponding to ISCED 2B	☐ _____
4.	Qualification corresponding to ISCED 2Av	☐ _____
5.	Qualification corresponding to ISCED 2Ag	☐ _____
6.	Qualification corresponding to ISCED 3Cs	☐ _____
7.	An outdated qualification corresponding to ISCED 3Cs	☐ _____
8.	Qualification corresponding to ISCED 3Cl	☐ _____
9.	Qualification corresponding to ISCED 3B	☐ _____
10.	Qualification corresponding to ISCED 3Av	☐ _____
11.	Another qualification corresponding to ISCED 3Av	☐ _____
12.	Qualification corresponding to ISCED 3Ag	☐ _____
13.	Qualification corresponding to ISCED 4C	☐ _____
14.	Qualification corresponding to ISCED 4B	☐ _____
15.	Qualification corresponding to ISCED 4Av	☐ _____
16.	Qualification corresponding to ISCED 4Ag	☐ _____
17.	Qualification corresponding to ISCED 5B	☐ _____
18.	Qualification corresponding to ISCED 5Am	☐ _____
19.	Qualification corresponding to ISCED 5Al	☐ _____
20.	Qualification corresponding to ISCED 6	☐ _____

B2 If 'none or education received abroad' at item A1: For how many years did you go to school? ☐

B3 If foreign qualification:
B3a Please indicate the specific qualification you obtained.

☐

B3b In which country did you achieve this qualification?

☐

FIGURE 8.2: Template for proposed country-specific data collection instruments on educational qualifications obtained

respondents' occupation; a specific value on an attitude scale or on a nominal scale indicating the respondents ethnicity; the year in which the respondent was born). The instrument is designed to closely reflect the theoretical construct we are interested in.

2. *Operational variables* are variables coded from the source variables, which may be too complex or otherwise unsuitable for use in statistical

analyses (e. g. numeric occupation codes; all educational qualifications the respondent obtained or very detailed codes for the highest educational qualification).

3. *Analytic variables* are derived from the 'operational variables' for the specific purpose of a particular piece of research and used in statistical analyses (e. g. social class membership; age; a respondents highest educational qualification).

The latter two types of information are produced in the post-collection processing of survey data. The distinction between operational and analytical variables is not necessary in those cases where the instrument and thus source variables are sufficiently simple so that analytical variables can be more or less directly derived from them. However, especially when coding of verbatim information or harmonisation of (possibly complex) country-specific source variables in cross-national variables is involved, operational variables are a useful intermediary tool in the measurement process. The distinction between source, operational and analytic variables is thus most useful when dealing with complex factual information such as occupational, employment and education data.

In order to improve the quality and relevance of cross-national educational attainment data, it is proposed to add another step to the measurement procedure and clearly differentiate between operational and analytical versions of the ISCED. The first step, as usual, would consist of collecting data on educational attainment in the national format (for which suggestions were made in Section 8.2.1). The second step would comprise the harmonisation process, whereby the CSEVs are translated into *detailed* ISCED categories. This is preferably performed in a centrally coordinated way so that consistency

across countries in the coding process is ensured. The resulting data represent the operational version of ISCED. In a *third* step only, the number of categories in the harmonised variable is reduced by aggregating specific ISCED sub-categories. The resulting variables are analytical versions of ISCED, and one proposal of such a simplified ISCED that comprises the whole range of qualifications was made in Section 6.3: The ES-ISCED.

This procedure would allow the provision of very detailed cross-nationally comparable data on educational attainment for later recoding (i. e. the operational version of ISCED) *alongside* simplified data (i. e. some analytical version of ISCED). It would then be far easier to derive more specific education variables from the detailed harmonised variable than directly from the CSEVs, as has been done for the ESS in this study. The only 'drawbacks' would be the initial effort to develop more detailed CSEVs and the somewhat more detailed coding effort, both implying higher costs of the survey (which cannot be estimated here). However, this could partly be offset by the use of a central infrastructure, taking this pressure off single survey organising bodies. Considering how many researchers use educational attainment variables in cross-national surveys in their work and would like to use high-quality and probably also purpose-built educational attainment variables, an investigation into the feasibility of improving educational attainment measures in this way would clearly be worth the effort.

In order to enable researchers to evaluate the harmonisation process, code their own educational attainment measures and to cross-check the conclusions reached by the EC, it would also be highly recommendable that EUROSTAT provided the CSEVs in their large cross-national data sets like EU-SILC and the EU-LFS, as is currently the case in the ESS.

8.2.3 *Summary recommendations*

This section summarises the suggestions made above in brief statements and are ordered according to who would need to take action in order for the measurement of educational attainment to be improved in cross-national surveys.

8.2.3.1 *Recommendations to the international organisations*

1. UNESCO and other interested international organisations should strengthen their efforts in the development and dissemination of information resources and meta data concerning the ISCED.[133] These documents should be promoted as standard tools for coding education related information in surveys, as ISCO 88 by the ILO is for occupation.
2. Outdated educational programmes and qualifications should be incorporated into the ISCED mappings in order to allow the consistent application of ISCED to the educational attainment of the whole adult population.
3. It should be investigated if funding could be obtained for either conducting a cross-national survey on educational attainment and social stratification processes since there are currently no cross-national data available to study these in any greater detail, or to upgrade one of the ongoing surveys (e. g. EU-SILC) in order to fill this gap.
4. Educational attainment should be defined as *an individual's highest level of education*. Two complementary indicators of this general concept can be specified: an individual's highest educational qualification and

133 This would include information on past and current educational programmes and qualifications available throughout the world, such as alphabetical indices of educational programmes and qualifications, and concise guidelines on how to implement and use ISCED 97 in cross-national surveys for the measurement of educational attainment. The implementation and usage guidelines should include recommendations to survey organisers, national teams and data users such as those mentioned in the next subsections.

highest educational programme attended. From a human capital and socialisation point of view, the highest *qualification obtained* and the highest level of education *attended* are both core criteria. The highest level of education attended is only relevant for individuals that followed some further higher educational programme after achieving their highest certificate. From a signalling or allocation point of view, the highest *qualification obtained* is the only criterion. Which exact indicator is chosen thus depends on the purpose of the survey and the planned usage of the data. For general social surveys, covering both indicators is recommended.

8.2.3.2 *Recommendations to survey organisers and national teams*

1. The target concept of educational attainment should be precisely specified in operational terms, and clear instructions should be given to national teams in order to maximise the standardisation of measurement across countries.
2. If the human capital, socialisation as well as the signalling/allocation conceptualisation of educational attainment are to be operationalised, both the highest educational programme attended (for a substantial amount of time, say at least six months) and the highest certificate obtained should be captured separately in the national questionnaires.
3. *Actual years of education* (not school-leaving age) should additionally be covered (using a questionnaire item that gives precise instructions to interviewers and respondents what and how to 'count'), since it is useful as a *supplementary* measure (which could e. g. be used to correct

for measurement error), for validation purposes and for deriving *hypothetical years of education*, as also suggested by Park (1999) for the US Current Population Survey.

4. All formal educational certificates should be covered by the response categories of the instruments for collecting data on educational attainment, no matter in which sector of the educational system they were achieved.
5. In those countries where missing information on educational attainment is common (say exceeds 5 % of the sample), this should be a priority for improving the country-specific measurement instrument and interviewing strategies.
6. 'Other' educational qualifications should be post-coded whenever possible in order to allow a clear assignment to levels of education and reduce the amount of missing data. If this is impossible, cases with 'other' qualifications should be treated as missing. Especially foreign educational qualifications should be catered for using an open response and post-coding.
7. If the ISCED is specified as the cross-national education classification to be implemented, concise information on the ISCED and its implementation in cross-national surveys should be obtained from the international organisations and provided to national teams.
8. The level of aggregation of categories in the data collection should not be too high as to prevent harmonisation into ISCED 97 (or CASMIN). Therefore, all qualifications that are assigned to distinct ISCED (or CASMIN) categories must form separate categories in the data collection instrument.[134]

134 Countries should be encouraged to make more distinctions since this is informative at the national level.

9. The ISCED mappings should be used for translating national educational qualifications into the ISCED scheme. Any deviations from the official ISCED mappings should be justified and documented.
10. Respondents without educational certificates that have not completed primary education should be coded as ISCED level 0, not as missing.
11. Respondents without educational certificates that have completed primary education should be coded as ISCED level 1.
12. Before publishing the data, the distributions should be checked for consistency with the best external data currently available, published in OECD's EAG. All substantial inconsistencies have to be accounted for by the documented deviations from the official ISCED mappings. Data quality checks should receive a higher priority than is currently the case.

8.2.3.3 *Recommendations to data coders and users*

1. The theoretical background of the study should be informative with respect to how educational attainment is operationalised for a specific study.
   - *Actual years of education* capture the time invested in education and duration of the educational experience, but not output. It is therefore unsuitable as a measure of educational attainment.
   - *Hypothetical years of education* are conceptually unspecific and only capture a vague 'more' or 'less' of education received. This measure should only be used as a control variable, i. e. when no substantive interpretation of education effects is sought.
   - Categorical measures of educational attainment can capture both the amount/level as well as type/quality of education. Which quality

aspects to use depends on the specific hypotheses to be tested (public vs. private, elite vs. mainstream, vocational vs. general etc.). If signalling plays a role in the underlying theory, a certificate based measure of educational attainment should be used.

2. When aggregating ISCED categories, qualifications classified as 3Cs (i. e. from short upper secondary vocational programmes) should be included in level 2 rather than 3 since these qualifications are substantially lower than maturity certificates or 'long' vocational qualifications.
3. The aggregation of vocational and general qualifications at some level of education into one category should be avoided since this can attenuate education effects to such a degree as to render the results incomparable across countries.
4. As a general rule, sensitivity analyses should be performed, checking the consequences of using different measures of educational attainment. Results from previous studies should also be taken into account in order to make sure that results are 'real' rather than measurement/harmonisation artifacts.

8.3 DIRECTIONS FOR FUTURE RESEARCH

There are a number of issues related to the quality of educational attainment data that this study did not address. This section highlights some remaining gaps that could be filled by future research, as well as some ways for this study to be extended beyond its current scope.

Firstly, different amounts of missing data across countries could negatively impact on the comparability of educational attainment distributions if missingness is not randomly distributed across all levels of education. A different

composition of missing values with respect to the true educational attainment across countries, given same amounts of missing values, is equally problematic. However, in most countries missing data on the educational attainment variable is relatively rare, so that the main challenge is to estimate the consequences of unit non-response on the adequacy of educational attainment distributions.

Secondly, this study was not concerned with random measurement error at the level of individual survey respondents, but with aggregate data consistency and validity. Although individual level reliability can be assumed to be relatively high for factual variables like educational attainment (Alwin, 2007), it would still be important to thoroughly study the reliability of educational attainment data through other research designs, which however require different data. This is usually prevented because data sources lack multiple (independent) measures of educational attainment that could help diagnosing unreliability: It is problematic to ask respondents for their highest educational qualification twice in one interview. However, using structural equation modelling techniques, measurement error could possibly be taken into account if educational qualifications and years of education are regarded as multiple indicators for educational attainment.[135] But if multiple indicators of educational attainment are scaled in such a way, the signalling character of specific education categories and the qualitative differentiation between general and vocational education get lost, which is dissatisfactory from a theoretical point of view.

Thirdly, there are many further aspects of education that could be the focus of future research, such as fields of education and training (van de Werfhorst, 2008, and articles in this special issue of the International Journal of

135 Work in this direction is currently ongoing at the University of Amsterdam (PhD project of Heike Schröder).

Comparative Sociology), adult/lifelong learning or differentiation of types of educational institutions (public vs. private; elite institutions, religious institutions etc.). ISCED 97 actually contains a classification of fields of education and training that has not yet been evaluated from a substantive and methodological point of view. There are reasons to expect that the cross-national harmonisation of subject areas is not straightforward because of cross-national differences in the historical development of subject differentiation. Also the usefulness of this classification in terms of the aggregations it suggests is unclear.

Fourthly, the measures evaluated in this study also could have been be coded differently, or different instruments from other surveys could have been used. For example, it is possible that some other way of collecting information on *actual years of education* is more suitable than the one chosen in the ESS. Since no survey however includes several measures of *actual years of education*, the performance of different such instruments cannot be easily compared. Equally, *hypothetical years of education* could have been derived differently, e. g. by always assigning the modal *actual years of education* to a given country-specific education category. Also, duration-based and certificate based measures could have been *combined* in one model like in Goodman (1979a).

Finally, the European Communities recently published the European Qualifications Framework for Lifelong Learning (EQF), which defines eight levels of learning outcomes in terms of knowledge, competences and skills (European Commission, 2008a). It does not aim to be a statistical classification, but a reference tool "to promote citizens' mobility between countries and to facilitate their lifelong learning" (European Commission, 2008a, p. 3). Because of its novelty and thus lacking information on its actual uses, the

EQF was not covered in this study. It remains to be seen if the EQF will be used in the future for data collections on educational attainment.

As a next step to complement the results of this study, it would be desirable to extend the scope of countries and outcome variables used for the construct validation. It would be important to know if the results of this study can be generalised to other outcome variables (such as health as well as specific social behaviours, attitudes and values that are known to be closely related to educational attainment, e. g. anti-immigrant attitudes and social participation) or if the degree of differentiation of educational attainment variables required for cross-national research differs across outcome variables. If this were the case, the conclusions reached here were restricted to social stratification processes, which could make the improvement of especially the CSEVs less pressing for the organisers of cross-national surveys if they are not concerned with social stratification. However, for theoretical reasons, social stratification is often of interest also if the main focus of a study lies in social attitudes, social networks or political participation: Societal hierarchies are one of the most important explanatory factors of individual characteristics and behaviour in the social sciences.

It would also be important to see if the proposed ES-ISCED is applicable beyond the European countries used in this study, especially other OECD countries such as the US or Japan that in principle show a similar or even higher level of educational development, but different educational structures. Finally, if measures of the different aspects of educational attainment were available, i. e. highest level of education attended, completed, *and* qualifications achieved, it could also be evaluated if qualifications are actually a sufficient indicator of educational attainment or if uncertified education needs to be covered as well.

A final issue of concern is the influence of choice of control variables. In this study, only a minimal set of controls—age and sex—was used. This choice is justified by the fact that these two variables are the only ones that are consistently controlled for in all individual level studies. It is possible that the addition of further explanatory or control variables changes the required level of detail of educational attainment variables. Especially introducing measures of ability, which explain educational attainment effects to a substantial degree, could make a difference. This issue however so largely depends on the specific situation that individual researchers will have to do sensitivity analyses in order to check which level of aggregation is defendable for a specific kind of analysis.

8.4 OUTLOOK

Education policy and academic research need good data. Relying on bad quality data or producing results of limited relevance could lead to policy decisions based on flawed information, which can have potentially negative consequences for future generations. For example, the highly aggregated education measures used in the EU-SILC and in the ESS systematically underestimate associations involving educational attainment in countries with highly stratified educational systems. Results such as those published by the European Commission (2008b) would imply that the German educational system promotes equality of educational opportunity, and could thus be used by the government to defend the highly tiered structure of the German educational system. Fortunately social stratification researchers familiar with the German case know that these results are misrepresenting the realities in DE, and can show this clearly through sensitivity analyses like the ones performed here in Chapter 7 or by Müller and Klein (2008). However,

since the country-specific education variables are not published for the EU-SILC data on which European Commission (2008b) was based, these specific results cannot be rectified. Also, it is questionable if policy makers would pay attention to academic research that disproves their policy preferences if the EC publishes results that fit their world view better. Then we end up with a purely political debate which does not take empirical evidence into account at all, rendering the investments in research (both academic and official) futile.

Let's put aside for a moment all considerations of practicality, such as resources for surveys, the 'politics' of data collection, and analytic possibilities, and reflect a little bit more on how we could avoid cross-national differences getting 'lost in harmonisation' *without* throwing the baby out with the bathwater by claiming that comparative research is the wrong way to go *anyway*. How would rich educational attainment data look that allowed us to confidently draw conclusions about actual differences between countries, while clearly excluding the possibility of measurement artefacts like aggregation error?

First of all, we must acknowledge that the 'greatest common denominator' has not yet been achieved by the most commonly used cross-national measures of educational attainment. Secondly, too often researchers simplify educational attainment in a country in stereotypical ways so that the measure reflects only an ideal-typical organisation of the educational system, which is often inadequate with respect to the ongoing blurring of the dividing lines between traditionally separate tracks and types of education and the spread of non-typical educational careers (see e. g. Hillmert and Jacob, 2003; Smith and Garnier, 1987). For example, the vocational and general education systems are far less divided in DE than often presented: There are voca-

tional gymnasia at the upper secondary level, and other vocational schools providing university entrance certificates (such as *Fachoberschule* and *Berufsoberschule*). The increasing amount of entirely school-based vocational education in DE or completion of vocational training after achievement of the *Abitur* are other cases in point, and more could be quoted. Since only qualifications obtained but neither awarding institutions nor educational careers are commonly captured in surveys, nobody can tell what this differentiation means in terms of access to post-secondary education and later stratification processes.[136] As is currently the trend with occupational attainment and social class measures ('microclasses', e. g. Grusky and Weeden, 2001; Jonsson et al., 2009; Weeden and Grusky, 2005), researchers should aim at disaggregating educational attainment in its constituent elements such as curriculum placement, institutions attended *and* certificates obtained for both country specific as well as cross-national research. The lack of detailed source data (in contrast to detailed occupation codes for constructing 'microclasses') however prevents this with currently available cross-national data. There is usually no information available on dimensions such as graduation from elite or mainstream institutions, public or private/religious institutions, free or fee-paying institutions, school based or combined school/work based (dual) programmes, and the like. Most of this information could be acquired with quite simple questionnaire items.

Maybe we have not yet exhausted all possibilities to incorporate national specificities in quantitative comparative research. I would thus call for some imaginative departures from our 'modelling habits': Comparative research might be conducted more fruitfully by actually steering away from the all-too-common assumption that maximum harmonisation is necessary in or-

136 For a similar argument with respect to the French educational system, see Smith and Garnier (1987).

der to compare countries, which usually works under the assumption that we need *one* measure of educational attainment with the *same number* of *non-empty* categories for each country. As already Przeworski and Teune (1966) argue (although for a different domain of inquiry), reliable and valid conclusions from cross-national research can only be made by combining cross-national and country-specific indicators: "single, identical indicators can only rarely be assumed to signify the same complex phenomenon in all societies" (Przeworski and Teune, 1966, p. 553). Why don't we just *use* all information available on national specificities in comparative studies in order to maximally allow for cross-national differences, rather than 'harmonising them away'? Sample sizes are not the only limiting factor; our lack of creativity on how to combine cross-national and country-specific data is another.

From a theoretical point of view, it might also make more sense to compare a low number of carefully selected countries in depth, using detailed educational attainment measures, rather than using all countries available in a cross-national survey and force the educational attainment measure in all countries to be simplified to become 'comparable' to the least informative measure used amongst all countries (see e. g. Ebbinghaus, 2005). Maximising the number of countries to be compared without proper theoretical reflection on the suitability of a specific choice of countries for drawing theoretical inferences only moves us back to a "black box approach" of comparing countries (Scheuch, 2000). Finally,

> "... for an adequate design and analysis in comparative research a social scientist needs to know quite a bit about countries other than his native one. Consequently, it has become Best Practice to work in teams with at least one native for each of the countries included in a study" (Scheuch, 2000, p. 74).

If cross-national research is a collaborative project, building methodological expertise and even an infrastructure supporting cross-national research is a collective endeavour. This expertise and infrastructure has grown substantially in the last decades, thanks to the commitment of individual researchers, experts in international organisations and bureaucrats. This growth in methodological expertise can and will continue, improving the data and information resources available for empirical social science research and the monitoring of educational systems. The provision of better cross-national measures for educational attainment in comparative surveys is primarily the survey organisers' responsibility. However, it would be helpful to accumulate the expertise from different cross-national surveys through joint workshops or conferences, and include the expertise from e. g. OECD, survey research methods centres and other institutions. The ultimate goal could be a supra-national infrastructure serving as a central contact point for developing and documenting harmonised demographic background variables for cross-national research to be derived from country-specific 'state-of-the-art' instruments. This institution could also consult cross-national survey organisers and national teams taking part in cross-national surveys on implementing such measures in surveys and researchers on how to use them. One prospect for this mission in the European context is the Council of European Social Science Data Archives (CESSDA), which is currently investigating requirements and priorities for a social science data harmonisation infrastructure. Since both, academics as well as policy makers, have a strong interest in high quality data on educational attainment, it can be hoped that collaboration between these 'two sides' will also grow further in the future.

However, compared to the work on occupational classification and measurement (Elias, 1997; Evans, 1992, 1996; Evans and Mills, 1998; Prandy, 1999a;

Rose and Pevalin, 2002), the methodological tool-set for measuring educational attainment cross-nationally still hugely trails behind. Why is that so? The academic community has maybe for too long accepted employment and the occupational structure to be the (only?) backbone of modern societies. It is time to adequately reflect the role educational systems and attainment play in social processes. To be sure, it is clear that the educational system and educational attainment have had already an important place in sociological research for a long time, and the PISA studies have sparked research on skills and competences in recent years. There is however a mismatch in its theoretical importance and in the methodological rigour with which education is conceptualised, measured and analysed. If today's societies are in fact 'knowledge societies', the neglect of basic research and technical infrastructure in the area of education statistics is indeed very hard to understand. This study then forms a mere starting point.

Part IV

APPENDIX

A

BACKGROUND DATA ON THE ESS, EU-SILC AND EU-LFS

TABLE A.1: Response rates in the ESS, EU-SILC and the EU-LFS

Country	ESS			EU-SILC 2005		EU-LFS
	ESS 1	ESS 2	ESS 3	Households	Respondents	2005
AT	60.6	62.4	64.0	63	100	89.3
BE	59.3	61.2	61.0	60	98	79.3
BG	.	.	64.8			83.3
CH	33.0	48.6	50.0			82
CY	.	.	67.3	91	100	97.2
CZ	43.0	55.3	.	65	100	80.2
DE	53.7	51.0	52.9	67	99	95.6
DK	68.4	64.2	50.8	70	100	63.4
EE	.	79.1	65.0	87	98	74.9
ES	53.6	54.9	66.2	74	97	80.4
FI	73.3	70.7	64.4	85	100	83.2
FR	43.1	43.6	46.0	84	99	80.9
GR	79.6	78.8	.	83	99	n.a.
HU	70.3	65.9	66.0	62	100	87.5
IE	64.4	62.5	56.8	72	100	90.9
IL	70.9	.	.			
IS	.	51.3	.	75	100	82.1
IT	43.4	59.3	.	86	100	90.6
LT				72	99	87.6
LU	43.2	50.1	.	71	100	33
LV	.	.	71.2	74	98	78.6
NL	67.8	64.3	59.8	30	100	86.6
NO	65.0	66.2	64.4	72	99	88
PL	72.2	73.7	70.1	71	95	78.8
PT	68.8	71.2	72.7	90	100	87.4
RO	.	.	71.8			96
RU	.	.	69.5			
SE	69.0	65.4	65.5	80	100	82.2
SI	71.8	70.2	64.9	64	100	83.8
SK	.	62.7	73.2	92	100	93.1
TR	.	50.7	.			85.1
UA	.	66.6	66.4			
UK	55.0	50.6	52.1	70	100	65.9
min	33	43.6	46	30.0	95.0	33
max	79.6	79.1	73.2	92	100	97.2
mean	60.4	61.6	63.1	73.5	99.3	82.3

Sources: Billiet and Pleysier (2007); Eurostat (2007b,d, 2008a); Jowell and the Central Co-ordinating Team (2005, 2008); Philippens and Billiet (2003); Symons et al. (2008).

B

DISTRIBUTIONS OF EDUCATIONAL ATTAINMENT IN THE ESS, EU-SILC AND EU-LFS

TABLE B.1: Distribution of educational attainment in the first three ESS rounds 2002–2007, variable *edulvl* in %

Country	Round	ESS ISCED categories							N
		< 1	1	2	3	4	5	6	
AT	2	1.2	15.0	47.3	20.9	6.2	.	9.4	1494
AT	3	0.5*	14.0	48.8	17.2*	9.9*	9.6†	.†	1587
BE	1	1.3	8.4	18.6	38.1	.	17.2	16.4	1186
BE	2	0.8	8.1	17.2	39.4	.	18.4	16.0	1161
BE	3	0.5	18.8*†	5.8*†	12.2*†	26.6†	35.4*†	0.6*†	1141
CH	1	0.8	.	9.8	57.9	13.5	14.2	3.9	1460
CH	2	1.5	.	8.8	58.6	12.9	15.8	2.4	1502
CH	3[c]	1.0	3.6†	6.6	55.8	4.3*†	26.9*†	1.8	1249
CZ	1	0.3	.	7.1	77.5	2.9	11.0	1.2	824
CZ	2	0.4	.	9.3	78.1	2.8	9.1	0.4*	2012
DE	1	.	1.1	5.7	60.9	6.4	24.7	1.2	1961
DE	2	.	1.5	6.3	58.9	6.8	25.4	1.0	1870
DE	3[c]	.	0.9	4.6	49.9*	12.5*	31.2*	0.9	1894
DK	1	0.1	0.3	15.8	49.1	13.6	20.2	0.9	1050
DK	2[c]	0.3	0.5	13.4	37.8*	15.9†	31.1*†	1.1	1032
DK	3	0.4	0.9	12.9	35.4	13.5	35.6	1.2	1044
EE	2	0.1	0.7	9.1	46.3	8.7	33.3	1.9	1190
EE	3[c]	0.0	0.2	11.7	44.0	17.9*†	21.9*†	4.4*	901
ES	1	10.8	18.1	21.4	21.0	9.0	19.0	0.8	1047
ES	2[c]	15.8*	15.7†	24.4†	17.7†	1.3*†	24.3*	0.8	1064
ES	3	7.3*	18.9	26.6	22.9*	1.2	22.2	0.9	1233
FI	1	0.3	12.2	16.2	37.6	.	32.5	1.1	1305
FI	2	0.2	9.9	12.5*	38.8	.	36.6	2.1	1314
FI	3	1.2*	9.1	10.6	38.8	.	38.2	2.1	1218
FR	1	6.2	12.6	30.3	3.5	17.2	11.7	18.5	996
FR	2	5.7	11.4	29.9	5.8*	16.7	12.9	17.7	1215
FR	3[c]	6.8	8.9	32.8	2.7*	18.1	14.5	16.2	1412
GR	1	5.0	26.4	19.1	31.9	4.8	12.2	0.7	1555
GR	2[c]	2.8*	27.1	17.2	31.6	7.1*	14.0	0.3	1481
HU	1	3.6	20.5	33.7	25.7	.	9.2	7.4	1099
HU	2[c]	1.4*	14.7*	23.8*†	32.7*†	3.0†	23.2*†	1.3*†	1033
HU	3	0.0*†	22.9*†	32.7*†	27.8*†	1.5*†	13.6*	1.4	961

Continued on the next page

TABLE B.1: Distribution of educational attainment in the first three ESS rounds 2002–2007, variable *edulvl* in % (*continued)*

Country	Round	ESS ISCED categories							N
		< 1	1	2	3	4	5	6	
IE	1	2.9	14.4	24.3	23.7	19.1	6.8	8.6	1413
IE	2	2.9	13.7	21.2	28.1*	17.9	10.9*	5.2*	1559
IE	3	3.5	8.2*	19.2	22.5*	23.2*	11.0	12.5*	1137
IT	1	1.3	15.4	35.5	38.0	1.8	6.3	1.6	855
IT	2[c]	0.7	11.9*	32.5	39.7	0.9†	12.4*†	1.9	1022
LU	1	0.7	24.2	9.2	38.9	2.4	23.8	0.9	910
LU	2	2.7*	23.4	12.1*	36.0	4.4*	20.5	0.9	1116
NL	1	0.5	4.4	33.6	30.6	6.4	24.2	0.3	1721
NL	2	0.4	5.6	30.0	29.4	6.9	26.9	0.7	1338
NL	3	1.0	4.8	25.5*	30.7	9.2	28.7	0.2	1338
NO	1	0.1	0.1	9.3	53.8	2.9	26.6	7.2	1470
NO	2‡	0.2	0.0	16.4*	31.9*	8.9*	25.9	16.8*	1257
NO	3	0.3	0.0	11.1*	33.0	11.1	43.3*	1.1*†	1211
PL	1	0.7	17.1	33.7	27.2	5.2	4.4	11.6	1311
PL	2[c]	0.5	14.7	34.5	30.4†	5.9	2.8†	11.2	1116
PL	3	0.3	16.4	35.2	28.7	4.6	2.6	12.1	1084
PT	1	5.9	53.8	15.4	16.5	.	8.4	0.1	938
PT	2	4.6	55.6	13.3	15.4†	.	10.4†	0.7	1223
PT	3[c]	4.5	52.9	14.3	16.1	.	11.6	0.7	1363
SE	1	0.3	16.3	24.2	20.9	.	17.4	20.9	1354
SE	2	0.9	16.8	21.3	22.9	.	16.3	21.7	1285
SE	3[c]	0.8	4.0*†	15.0*†	37.5*†	.	40.6*†	2.0*†	1276
SI	1	3.6	18.6	26.6	30.9	7.3	12.0	0.9	988
SI	2	2.2	16.0	27.6	33.3	6.4	13.5	1.1	881
SI	3	1.8	16.4	26.6	29.8	6.8	16.9	1.7	945
SK	2	0.8	.	10.2	72.1	3.5	12.3	1.1	951
SK	3	.†	1.5†	9.7	70.7	3.7	13.6	0.8	1132
UA	2	0.2	1.7	4.6	31.0	44.7	2.7	15.1	1201
UA	3	0.1	1.4	7.1*	30.3	40.8*	1.7	18.5*	1216
UK	1	0.1	0.5	47.5	12.9	11.6	26.5	1.0	1364
UK	3	0.0	0.2	40.3*	11.4	10.8	35.4*	1.8	1543

Source: European Social Survey 2002–2007, own calculations. Respondents aged 25-64. Weighted using the design weight (*dweight*). Only countries that participated in at least two rounds are shown.
Notes:
[c] = CSEV changed in this round;
† = Composition of ISCED category with respect to country-specific categories contributing to it changed in this round. If the CSEV changed, affected ISCED categories are marked;
‡ = Data source changed in this round (from register to survey data);
∗ = Statistically significant ($p \leqslant 0.05$) change in category size compared to the previous ESS round

TABLE B.2: Distribution of educational attainment in the EU-SILC 2004–2006 according to ISCED 97, %

Country	Year	EU-SILC ISCED categories						N
		< 1	1	2	3	4	5 & 6	
AT	2004	.	6.8	18.9	47.7	10.5	16.0	6330
AT	2005	.	0.7	17.8	51.6	9.8	20.1	7187
AT	2006	.	1.1	17.6	52.6	9.2	19.5	8026
BE	2004	5.1	9.5	15.1	33.9	2.5	33.9	6773
BE	2005	5.3	8.6	14.5	32.8	2.6	36.1	6467
BE	2006	4.9	8.1	13.7	32.4	3.3	37.6	7688
CY	2005	3.0	17.3	10.3	36.5	2.7	30.1	5978
CY	2006	3.1	16.8	10.0	36.5	2.9	30.8	5744
CZ	2005	.	0.3	9.4	75.1	1.8	13.5	5742
CZ	2006	0.2	0.1	9.1	76.1	1.2	13.3	9767
DE	2005	.	1.2	7.7	43.4	8.8	39.0	16321
DE	2006	.	2.5	12.6	52.0	9.6	23.3	16743
DK	2004	.	0.5	26.0	46.4	0.1	27.1	9706
DK	2005	.	0.3	25.3	46.0	0.1	28.3	8477
DK	2006	.	0.3	24.9	45.6	0.1	29.0	8026
EE	2004	0.3	1.1	10.4	49.0	8.8	30.5	5525
EE	2005	0.2	0.9	9.8	47.9	10.8	30.3	5783
EE	2006	0.2	0.7	10.1	48.0	9.8	31.2	7705
ES	2004	2.3	19.3	29.4	20.6	0.2	28.2	20827
ES	2005	2.1	26.6	21.2	20.2	1.9	28.1	19946
ES	2006	2.1	24.0	22.9	20.7	1.4	28.9	18656
FI	2004	.	.	21.5	44.1	0.3	34.0	16043
FI	2005	.	.	20.4	44.3	0.3	35.1	15879
FI	2006	.	.	19.9	43.2	0.4	36.5	15111
FR	2004	16.1	8.9	7.5	43.0	1.4	23.2	12801
FR	2005	15.1	8.9	7.1	43.1	1.4	24.3	12474
FR	2006	14.7	8.2	7.2	43.3	1.5	25.0	12823
GR	2004	0.7	30.1	11.5	31.2	5.3	21.2	8887
GR	2005	0.6	28.9	11.2	31.5	5.6	22.2	7731
GR	2006	0.5	29.1	11.8	31.5	5.7	21.4	7902
HU	2005	0.6	1.6	22.0	58.5	0.6	16.8	9702
HU	2006	0.2	2.8	17.1	58.3	3.2	18.4	10757
IE	2004	0.9	20.3	20.9	21.3	9.4	27.3	6745
IE	2005	0.7	19.6	20.5	20.9	9.7	28.6	7295
IE	2006	0.6	18.7	20.1	20.6	9.8	30.2	6800
IS	2004	.	1.7	30.8	36.8	7.9	22.8	4401
IS	2005	.	1.2	29.2	35.9	9.2	24.6	4375
IS	2006	.	1.0	28.4	34.9	9.1	26.7	4309

Continued on the next page

TABLE B.2: Distribution of educational attainment in the EU-SILC 2004–2006 according to ISCED 97, % (*continued)*

Country	Year	EU-SILC ISCED categories						N
		< 1	1	2	3	4	5 & 6	
IT	2004	3.1	15.9	33.1	32.5	4.1	11.3	34586
IT	2005	1.8	15.5	32.8	31.6	5.4	13.0	31286
IT	2006	1.8	13.7	33.1	31.5	6.4	13.5	30196
LT	2005	0.3	1.6	9.9	35.6	27.4	25.3	6299
LT	2006	0.5	1.4	9.6	34.9	27.2	26.5	6234
LU	2004	0.4	26.2	10.0	37.1	2.6	23.7	5414
LU	2005	0.3	25.0	10.2	36.7	2.5	25.2	5445
LU	2006	0.5	24.5	10.1	36.5	2.8	25.6	5784
LV	2005	0.8	12.4	4.1	50.6	12.3	19.9	4816
LV	2006	0.2	0.8	14.0	51.9	11.6	21.5	5411
NL	2005	0.4	6.1	20.9	37.6	3.3	31.7	12882
NL	2006	0.4	5.9	21.0	37.8	3.6	31.3	12771
NO	2004	2.7	0.1	10.3	53.5	3.1	30.4	8583
NO	2005	0.2	0.1	9.8	54.7	3.1	32.0	8252
NO	2006	0.1	0.1	21.4	42.5	3.2	32.7	7687
PL	2005	0.6	14.7	.	64.1	3.8	16.8	24785
PL	2006	0.6	13.7	.	63.9	4.3	17.6	22871
PT	2004	6.8	52.3	14.8	12.3	.	13.8	7444
PT	2005	5.7	53.2	14.5	13.2	0.2	13.2	6727
PT	2006	5.1	53.4	14.7	13.6	0.4	12.8	6376
SE	2004	.	6.6	8.6	46.0	6.9	31.8	7346
SE	2005	.	5.1	8.7	46.3	7.6	32.3	7894
SE	2006	.	5.4	9.1	46.4	6.3	32.8	8891
SI	2005	0.5	20.1	2.6	59.1	6.0	11.7	15839
SI	2006	0.4	13.5	7.6	59.9	4.0	14.6	18228
SK	2005	0.1	0.1	7.4	74.9	.	17.5	8604
SK	2006	0.1	0.3	6.0	75.1	.	18.5	8285
UK	2005	0.1	.	19.6	39.3	5.8	35.3	12319
UK	2006	0.2	.	23.5	37.5	3.7	35.1	11253

Source: EU-SILC 2004–2006, cross-sectional files from Eurostat. Respondents aged 25-64. Weighted using the cross-sectional weighting factor (*pb040*).
Notes: Since nearly all differences across years are statistically significant, they are not marked in this table as in Table B.1.

Table B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, %

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
AT	2003	Q1	.	.	21.2	.	.	.	55.6	.	6.6	.	.	9.3	7.3	.	30895
AT	2003	Q2	.	.	21.7	.	.	.	56.1	.	6.9	.	.	8.2	7.0	.	27760
AT	2003	Q3	.	.	19.8	.	.	.	57.0	.	7.4	.	.	8.3	7.6	.	29847
AT	2003	Q4	.	.	20.9	.	.	.	56.7	.	7.1	.	.	7.7	7.6	.	27082
AT	2004	Q1	.	.	20.1	3.7	.	.	48.3*	.	.	9.1	.	9.4	8.8	0.5	24712
AT	2004	Q2	.	.	19.8	3.5	.	.	49.5	.	.	8.7	.	9.1	8.8	0.5	27003
AT	2004	Q3	.	.	19.8	3.5	.	.	49.8	.	.	8.8	.	9.0	8.7	0.4	27663
AT	2004	Q4	.	.	19.5	3.5	.	.	50.6	.	.	8.4	.	9.0	8.6	0.4	27956
AT	2005	Q1	.	.	19.5	3.5	.	.	50.7	.	.	8.5	.	8.9	8.6	0.4	28084
AT	2005	Q2	.	.	20.0	3.4	.	.	50.5	.	.	8.5	.	8.8	8.5	0.4	28136
AT	2005	Q3	.	.	19.4	3.4	.	.	50.3	.	.	9.3	.	8.6	8.6	0.4	27911
AT	2005	Q4	.	.	18.7	3.6	.	.	50.1	.	.	9.6	.	8.4	9.0	0.5	27876
BE	2003	Q1	.	17.9	21.1	.	.	8.5	23.3	.	1.0	.	.	15.7	12.2	0.4	15202
BE	2003	Q2	.	18.1	20.5	.	.	8.7	23.3	.	1.1	.	.	15.4	12.4	0.4	15174
BE	2003	Q3	.	16.8	20.1	.	.	8.5	23.4	.	1.1	.	.	16.3	13.4	0.4	15176
BE	2003	Q4	.	16.2	21.1	.	.	7.8	24.1	.	1.1	.	.	16.5	12.7	0.4	15353
BE	2004	Q1	.	16.7	19.6	.	.	8.3	23.5	.	1.3	.	.	16.7	13.4	0.5	15991
BE	2004	Q2	.	16.6	19.8	.	.	9.1	23.5	.	1.2	.	.	16.8	12.6	0.4	15705
BE	2004	Q3	.	16.0	18.7	.	.	9.3	23.8	.	1.4	.	.	16.9	13.5	0.4	15726
BE	2004	Q4	.	15.9	19.5	.	.	9.2	23.6	.	1.2	.	.	16.6	13.5	0.4	15847
BE	2005	Q1	6.1	9.6*	18.6	.	.	8.8	24.8	.	1.8	.	.	16.4	13.3	0.5	15753
BE	2005	Q2	5.7	9.8	19.1	.	.	8.7	24.0	.	2.0	.	.	17.1	13.2	0.5	15449
BE	2005	Q3	5.0	10.5	18.1	.	.	9.0	23.8	.	1.8	.	.	18.0	13.2	0.5	15271
BE	2005	Q4	5.0	10.0	18.1	.	.	9.2	24.7	.	1.6	.	.	17.6	13.4	0.4	15074

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TABLE B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued*)

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
CY	2003	Q2	5.2	19.6	9.2	1.3	.	.	32.5	.	2.8	.	.	10.6	18.6	0.3	5649
CY	2004	Q2	4.3	19.6	10.5	1.3	.	.	32.0	.	2.9	.	.	11.0	18.2	0.2	5583
CY	2004	Q3	4.0	19.1	10.1	1.1	.	.	33.4	.	2.4	.	.	11.2	18.3	0.3	5639
CY	2004	Q4	3.5	18.8	10.7	0.9	.	.	33.9	.	2.2	.	.	11.4	18.5	0.2	5542
CY	2005	Q1	3.4	19.6	10.8	0.9	.	.	33.8	.	2.3	.	.	11.1	17.9	0.3	5412
CY	2005	Q2	2.9	19.4	11.5	0.9	.	.	34.6	.	3.0	.	.	10.5	16.9	0.4	5222
CY	2005	Q3	2.5	19.0	10.4	0.8	.	.	35.6	.	3.3	.	.	11.1	16.8	0.5	5188
CY	2005	Q4	2.2	18.6	10.0	0.6	.	.	36.3	.	2.6	.	.	11.9	17.3	0.5	5216
CZ	2003	Q1	0.2	0.1	11.5	1.2	0.3	42.0	31.4	.	1.4	.	.	0.3	11.0	0.5	33724
CZ	2003	Q2	0.2	0.1	11.3	1.9*	0.7*	40.9	31.6	.	1.4	.	.	0.2	11.1	0.6	33815
CZ	2003	Q3	0.2	0.1	11.0	2.4	0.9	40.4	31.5	.	1.4	.	.	0.2	11.3	0.6	33937
CZ	2003	Q4	0.2	0.1	10.9	3.0	1.1	39.9	31.2	.	1.5	.	.	0.3	11.3	0.6	34209
CZ	2004	Q1	0.1	0.1	10.9	3.3	1.3	39.1	31.4	.	1.5	.	.	0.4	11.3	0.6	34776
CZ	2004	Q2	0.1	0.1	10.8	3.2	1.2	39.0	31.7	.	1.6	.	.	0.4	11.4	0.6	35097
CZ	2004	Q3	0.1	0.1	10.7	.	.	43.2*	32.1	.	1.6	.	.	0.4	11.2	0.6	35054
CZ	2004	Q4	0.1	0.1	10.6	.	.	42.9	32.2	.	1.7	.	.	0.5	11.5	0.6	35114
CZ	2005	Q1	0.1	0.1	10.3	.	.	42.7	32.4	.	1.7	.	.	0.5	11.6	0.6	35146
CZ	2005	Q2	0.1	0.1	9.9	.	.	42.4	32.6	.	1.7	.	.	0.6	11.9	0.6	34950
CZ	2005	Q3	0.1	0.1	9.7	.	.	42.6	32.8	.	1.7	.	.	0.5	12.0	0.5	34712
CZ	2005	Q4	0.1	0.1	9.7	.	.	42.5	32.6	.	1.8	.	.	0.6	12.2	0.5	34808

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Table B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued)*

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
DE	2003	Q2	.	2.6	13.9	.	.	.	53.4	.	.	5.9	.	9.9	12.7	1.7	173666
DE	2004	Q2	.	2.4	13.7	.	.	.	52.7	.	.	6.1	.	10.3	13.3	1.6	170587
DE	2005	Q1	.	3.3*	12.9	.	.	.	53.1	.	.	6.4	.	9.7	13.4	1.2*	56178
DE	2005	Q2	.	3.2	13.7*	.	.	.	51.9*	.	.	6.6	.	9.6	13.9	1.2	64391
DE	2005	Q3	.	3.2	14.2	.	.	.	51.3	.	.	6.4	.	9.7	14.2	1.2	65627
DE	2005	Q4	.	3.4	14.2	.	.	.	50.7	.	.	6.6	.	9.9	14.1	1.2	72488
DK	2003	Q1	0.9	0.4	17.2	1.8	0.1	43.8	4.1	.	.	0.1	0.0	6.7	24.4	0.5	9278
DK	2003	Q2	0.7	0.2	17.2	1.6	0.0	44.6	3.8	.	.	0.0	0.0	6.8	24.6	0.3	8822
DK	2003	Q3	0.7	0.2	16.1	1.7	0.0	45.0	3.9	.	.	0.0	0.0	7.1	24.8	0.4	8428
DK	2003	Q4	0.8	0.3	16.4	1.7	0.0	44.7	4.3	.	.	0.0	0.0	7.0	24.4	0.4	8379
DK	2004	Q1	0.8	0.5	16.4	1.7	.	43.9	3.7	.	.	0.0	0.0	7.6	24.9	0.4	8979
DK	2004	Q2	1.0	0.3	15.6	1.6	.	44.5	4.4	.	.	0.0	0.0	7.2	24.9	0.3	8823
DK	2004	Q3	0.9	0.3	14.9	1.7	.	44.6	4.2	.	.	0.0	0.1	7.9	25.0	0.3	8309
DK	2004	Q4	0.9	0.2	16.1	1.9	.	43.9	3.8	.	.	0.0	0.1	7.7	25.0	0.3	8375
DK	2005	Q1	0.9	0.2	16.5	1.7	.	43.5	3.8	.	.	0.0	0.0	7.4	25.5	0.5	8389
DK	2005	Q2	1.1	0.2	16.0	1.5	.	44.3	3.8	.	.	0.0	0.0	7.2	25.3	0.4	8334
DK	2005	Q3	1.2	0.4	15.8	1.7	.	43.0	4.0	.	.	0.0	0.0	7.8	25.7	0.4	8324
DK	2005	Q4	1.0	0.4	15.7	1.7	.	43.3	4.0	.	.	0.0	0.1	7.8	25.8	0.4	8252

Continued on the next page

TABLE B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued*)

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
EE	2003	Q1	0.3	1.2	11.0	5.2	.	1.2	42.7	.	.	8.4	.	11.0	18.5	0.4	2559
EE	2003	Q2	0.2	0.8	10.9	6.1	.	0.8	41.5	.	.	9.4	.	12.1	18.0	0.2	2518
EE	2003	Q3	0.2	0.7	10.4	5.9	.	1.3	42.1	.	.	8.7	.	11.6	19.0	0.2	2605
EE	2003	Q4	0.3	0.5	10.3	7.0	.	0.8	42.5	.	.	7.6	.	11.4	19.5	0.3	2642
EE	2004	Q1	0.3	0.5	10.4	6.9	.	1.3	41.3	.	.	7.9	.	12.3	18.8	0.4	2513
EE	2004	Q2	0.3	0.7	10.2	6.9	.	0.7	40.9	.	.	8.9	.	11.6	19.5	0.3	2365
EE	2004	Q3	0.4	0.7	10.3	.	.	7.1*	42.0	.	.	8.2	.	10.5	20.5	0.1	2342
EE	2004	Q4	0.3	0.5	10.5	.	.	8.0	42.2	.	.	7.4	.	11.2	19.6	0.4	2415
EE	2005	Q1	0.2	0.7	9.8	.	.	7.7	42.2	.	.	7.4	.	11.8	19.6	0.5	2470
EE	2005	Q2	0.4	0.3	10.4	.	.	6.9	41.3	.	.	7.1	.	11.4	21.6	0.5	2300
EE	2005	Q3	0.5	0.7	10.2	.	.	6.4	41.5	.	.	6.5	.	10.6	22.8	0.7	2311
EE	2005	Q4	0.3	0.7	10.1	.	.	5.7	43.1	.	.	7.0	.	10.4	22.4	0.4	2463
ES	2003	Q1	1.5	29.1	26.5	0.3	.	.	17.5	.	.	.	0.1	7.1	17.6	0.3	93216
ES	2003	Q2	1.4	28.5	26.9	0.3	.	.	17.6	.	.	.	0.1	7.2	17.6	0.3	93380
ES	2003	Q3	1.4	28.5	26.4	0.4	.	.	18.0	.	.	.	0.1	7.1	17.7	0.3	92527
ES	2003	Q4	1.4	27.9	26.5	0.4	.	.	18.1	.	.	.	0.1	7.2	18.1	0.3	93936
ES	2004	Q1	1.4	27.2	26.5	0.4	.	.	18.2	.	.	.	0.1	7.2	18.5	0.4	94428
ES	2004	Q2	1.3	26.8	26.5	0.4	.	.	18.5	.	.	.	0.1	7.5	18.5	0.4	94217
ES	2004	Q3	1.3	26.5	26.6	0.4	.	.	18.6	.	.	.	0.1	7.6	18.5	0.4	92356
ES	2004	Q4	1.4	26.1	26.6	0.4	.	.	18.8	.	.	.	0.1	7.5	18.6	0.4	93103
ES	2005	Q1	1.0*	25.5	25.5	0.3	.	0.1	20.0	.	.	.	0.1	7.9	19.1	0.5	84952
ES	2005	Q2	1.0	23.5*	26.8	0.3	.	0.1	20.0	.	.	.	0.1	8.2	19.5	0.6	83634
ES	2005	Q3	1.0	22.7	27.2	0.3	.	0.1	20.1	.	.	.	0.1	8.5	19.4	0.6	81478
ES	2005	Q4	0.9	22.3	27.5	0.3	.	0.1	20.2	.	.	.	0.1	8.7	19.3	0.6	82053

Continued on the next page

TABLE B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued)*

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
FI	2003	Q1	.	14.5	9.6	.	.	.	42.3	.	.	.	0.3	16.9	15.6	0.9	26405
FI	2003	Q2	.	14.3	10.2	.	.	.	42.5	.	.	.	0.2	17.0	15.1	0.7	26083
FI	2003	Q3	.	13.9	9.8	.	.	.	42.8	.	.	.	0.2	17.0	15.6	0.7	26153
FI	2003	Q4	.	13.7	9.9	.	.	.	42.9	.	.	.	0.3	17.0	15.6	0.7	26349
FI	2004	Q1	.	13.4	9.6	.	.	.	42.3	.	.	.	0.3	17.2	16.4	0.8	26362
FI	2004	Q2	.	12.9	9.6	.	.	.	43.3	.	.	.	0.3	16.9	16.4	0.7	25596
FI	2004	Q3	.	12.8	9.4	.	.	.	43.7	.	.	.	0.2	16.8	16.4	0.7	25664
FI	2004	Q4	.	12.2	9.7	.	.	.	43.5	.	.	.	0.2	16.8	16.9	0.8	26151
FI	2005	Q1	.	12.0	9.6	.	.	.	43.0	.	.	.	0.3	17.0	17.3	0.8	25970
FI	2005	Q2	.	11.1	9.8	.	.	.	44.3	.	.	.	0.3	16.6	17.1	0.8	25247
FI	2005	Q3	.	11.2	10.0	.	.	.	44.0	.	.	.	0.3	16.4	17.3	0.8	25368
FI	2005	Q4	.	11.1	10.1	.	.	.	44.1	.	.	.	0.3	16.2	17.3	0.8	25663
FR	2003	Q1	1.2	14.7	19.4	.	.	29.7	11.7	.	0.1	.	.	9.0	13.5	0.6	44604
FR	2003	Q2	1.2	14.4	19.5	.	.	29.5	11.8	.	0.1	.	.	9.2	13.7	0.6	43945
FR	2003	Q3	1.3	14.5	19.7	.	.	29.6	11.8	.	0.1	.	.	9.0	13.5	0.6	42403
FR	2003	Q4	1.3	14.3	19.8	.	.	29.4	11.8	.	0.1	.	.	9.3	13.5	0.5	44288
FR	2004	Q1	1.3	14.1	19.4	.	.	29.6	11.9	.	0.1	.	.	9.4	13.6	0.6	44779
FR	2004	Q2	1.3	13.9	19.6	.	.	29.1	12.1	.	0.1	.	.	9.6	13.7	0.6	44453
FR	2004	Q3	1.3	13.7	19.8	.	.	29.3	12.1	.	0.1	.	.	9.5	13.7	0.6	42969
FR	2004	Q4	1.3	13.1	19.8	.	.	28.8	12.4	.	0.1	.	.	9.8	13.9	0.6	44843
FR	2005	Q1	1.1	13.1	19.4	.	.	28.8	12.6	.	0.1	.	.	10.0	14.3	0.6	44662
FR	2005	Q2	1.1	13.3	19.2	.	.	28.9	12.8	.	0.1	.	.	9.8	14.2	0.6	44336
FR	2005	Q3	1.0	13.2	19.4	.	.	28.6	12.8	.	0.1	.	.	10.1	14.1	0.6	42878
FR	2005	Q4	1.0	13.4	19.2	.	.	28.4	12.9	.	0.1	.	.	10.2	14.2	0.6	43647

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TABLE B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued*)

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
GR	2003	Q1	1.2	33.2	10.5	2.3	.	0.3	27.4	.	.	.	6.8	4.9	13.3	0.2	39039
GR	2003	Q2	1.1	33.2	9.9	2.5	.	0.5	27.6	.	.	.	6.7	5.4	13.0	0.2	38463
GR	2003	Q3	1.0	32.9	10.2	2.4	.	0.5	27.7	.	.	.	6.8	5.4	13.0	0.2	38387
GR	2003	Q4	1.0	32.6	10.3	2.4	.	0.4	27.7	.	.	.	7.0	5.3	13.0	0.2	38179
GR	2004	Q1	.	30.2	10.8	2.3	.	0.3	27.7	.	.	.	8.2	5.9	14.2	0.4	42162
GR	2004	Q2	0.9	29.6	10.8	2.5	.	0.2	27.4	.	.	.	8.1	6.0	14.2	0.4	42823
GR	2004	Q3	0.9	29.4	10.7	2.5	.	0.2	27.7	.	.	.	8.2	6.0	14.0	0.4	42651
GR	2004	Q4	0.8	29.1	10.7	2.5	.	0.2	28.0	.	.	.	8.2	6.1	14.1	0.4	42255
GR	2005	Q1	0.8	29.0	10.8	2.6	.	0.2	28.1	.	.	.	8.2	6.0	13.9	0.4	41865
GR	2005	Q2	0.8	28.6	10.9	2.5	.	0.2	28.2	.	.	.	8.2	6.1	14.1	0.4	41447
GR	2005	Q3	0.8	28.1	11.0	2.5	.	0.3	28.4	.	.	.	8.4	6.0	14.3	0.3	41284
GR	2005	Q4	0.8	27.6	10.9	2.5	.	0.3	28.5	.	.	.	8.6	6.1	14.4	0.3	40724
HU	2003	Q1	.	2.3	24.3	.	.	29.3	27.5	.	.	1.6	.	0.1	14.7	0.2	49925
HU	2003	Q2	.	2.2	23.8	.	.	29.4	27.8	.	.	1.6	.	0.1	14.9	0.2	47626
HU	2003	Q3	.	2.3	23.6	.	.	29.1	27.9	.	.	1.6	.	0.1	15.1	0.3	46027
HU	2003	Q4	.	2.2	23.1	.	.	29.0	28.0	.	.	1.7	.	0.1	15.6	0.3	45792
HU	2004	Q1	.	2.2	22.8	.	.	28.7	28.2	.	.	1.7	.	0.1	16.0	0.3	45276
HU	2004	Q2	.	2.1	22.8	.	.	28.7	28.1	.	.	1.7	.	0.2	16.2	0.3	44713
HU	2004	Q3	.	2.0	22.6	.	.	28.7	28.0	.	.	1.8	.	0.2	16.5	0.3	44161
HU	2004	Q4	.	1.9	22.2	.	.	29.1	28.0	.	.	1.7	.	0.2	16.4	0.3	43016
HU	2005	Q1	.	1.8	22.3	.	.	29.2	27.9	.	.	1.8	.	0.2	16.4	0.3	42481
HU	2005	Q2	.	1.9	22.1	.	.	29.3	27.8	.	.	1.9	.	0.2	16.5	0.3	42082
HU	2005	Q3	.	1.8	21.6	.	.	29.6	27.9	.	.	1.9	.	0.2	16.6	0.3	42284
HU	2005	Q4	.	1.7	21.2	.	.	29.9	28.1	.	.	2.0	.	0.2	16.6	0.3	41840

Continued on the next page

Table B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued)*

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
IE	2003	Q1	0.6	19.4	19.2	0.1	17.3	.	5.6	.	.	.	12.1	9.6	15.5	0.5	50760
IE	2003	Q2	0.6	18.5	19.1	0.3	9.1*	.	14.0*	.	.	.	11.7	9.9	16.4	0.5	50386
IE	2003	Q3	0.6	18.4	19.2	0.1	20.2*	.	3.9*	.	.	.	11.4	10.3	15.5	0.4	47493
IE	2003	Q4	0.6	18.0	19.0	.	20.8	.	3.7	.	.	.	11.3	10.3	15.9	0.4	47974
IE	2004	Q1	0.6	17.8	18.9	0.1	20.8	.	3.7	.	.	.	11.1	10.6	16.1	0.5	45955
IE	2004	Q2	0.6	17.7	18.7	0.1	.	.	24.2*	.	.	.	10.5	10.5	17.3	0.4	43332
IE	2004	Q3	0.6	18.3	18.7	0.1	.	.	24.1	.	.	.	10.7	10.4	16.8	0.5	41022
IE	2004	Q4	0.6	17.9	18.5	0.1	.	.	24.4	.	.	.	10.5	10.4	17.3	0.5	44326
IE	2005	Q1	0.5	17.4	18.5	0.1	.	.	24.2	.	.	.	10.8	10.7	17.4	0.5	43708
IE	2005	Q2	0.5	16.7	18.1	0.1	.	.	24.6	.	.	.	10.9	10.7	17.9	0.5	45645
IE	2005	Q3	0.5	16.5	18.2	0.1	.	.	24.7	.	.	.	10.9	10.6	18.0	0.5	43947
IE	2005	Q4	0.5	16.1	18.1	0.1	.	.	24.7	.	.	.	10.9	10.5	18.6	0.5	46898
IS	2003	Q1	.	4.0	29.2	7.4	.	19.0	9.3	.	.	.	2.5	4.4	24.2	0.0	2255
IS	2003	Q2	.	4.2	28.2	7.7	.	19.3	8.7	.	.	.	3.3	4.3	24.3	0.0	2265
IS	2004	Q1	.	3.1	28.6	8.1	.	20.0	8.8	.	.	.	2.4	4.5	24.3	0.0	2216
IS	2004	Q2	.	3.4	29.4	7.2	.	20.7	8.8	.	.	.	2.7	4.3	23.5	0.0	2198
IS	2004	Q3	.	2.9	28.6	6.4	.	21.6	7.8	.	.	.	2.7	4.8	25.2	0.0	2135
IS	2004	Q4	.	2.4	28.7	7.1	.	21.4	7.9	.	.	.	2.9	5.0	24.7	0.0	2115
IS	2005	Q1	.	2.8	28.8	7.5	.	20.3	8.5	.	.	.	2.7	4.7	24.9	0.0	2109
IS	2005	Q2	.	2.2	27.7	6.6	.	21.8	8.5	.	.	.	2.1	4.6	26.5	0.0	2057
IS	2005	Q3	.	2.8	27.4	6.1	.	21.3	8.6	.	.	.	2.5	4.7	26.6	0.0	2076
IS	2005	Q4	.	3.1	27.2	6.6	.	20.9	9.3	.	.	.	2.7	4.6	25.5	0.0	2127

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TABLE B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued*)

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
IT	2003	Q1	2.2	17.6	35.4	6.3	.	.	26.5	.	1.6	.	.	.	10.2	0.3	107515
IT	2003	Q2	2.3	16.4*	34.4	.	.	6.4	28.3*	.	.	.	1.4	0.3	10.0	0.4*	106393
IT	2003	Q3	2.0	16.0	35.1	.	.	6.4	28.5	.	.	.	1.4	0.3	10.0	0.4	105906
IT	2003	Q4	1.8	15.8	35.3	.	.	6.4	28.6	.	.	.	1.2	0.3	10.0	0.5	106014
IT	2004	Q1	2.5*	16.3	32.0*	0.7*	.	7.2*	28.5	.	.	.	1.3	0.5*	11.0*	0.1*	94783
IT	2004	Q2	2.7	16.0	32.4	0.7	.	7.3	28.3	.	.	.	1.2	0.5	10.8	0.1	93722
IT	2004	Q3	2.6	15.8	32.7	0.7	.	7.2	28.5	.	.	.	1.1	0.5	10.8	0.1	96894
IT	2004	Q4	2.4	15.3	32.2	0.7	.	7.0	29.1	.	.	.	1.2	0.5	11.4	0.1	98389
IT	2005	Q1	2.3	15.2	31.9	0.6	.	7.0	29.6	.	.	.	1.1	0.5	11.6	0.1	98740
IT	2005	Q2	2.4	15.3	32.0	0.6	.	7.3	29.4	.	.	.	1.1	0.5	11.3	0.1	96044
IT	2005	Q3	2.3	14.8	32.4	0.6	.	7.5	29.1	.	.	.	1.1	0.5	11.5	0.1	91863
IT	2005	Q4	2.1	14.2	32.2	0.6	.	7.3	29.7	.	.	.	1.2	0.5	12.1	0.1	94027
LT	2003	Q1	.	3.1	11.3	3.1	.	.	30.8	.	29.1	.	.	4.8	17.7	0.1	6465
LT	2003	Q2	.	2.7	11.2	3.5	.	.	30.7	.	28.6	.	.	5.3	17.7	0.2	6362
LT	2003	Q3	.	2.8	11.0	3.5	.	.	30.6	.	28.6	.	.	5.9	17.4	0.3	6329
LT	2003	Q4	.	2.7	11.0	3.2	.	.	30.5	.	29.2	.	.	5.8	17.6	0.1	6334
LT	2004	Q1	0.2	2.1	11.4	2.7	.	0.7	29.9	.	.	28.2	.	6.5	18.3	0.2	6278
LT	2004	Q2	0.3	1.9	11.1	2.2	.	0.8	31.4	.	.	27.9	.	6.3	17.9	0.2	6257
LT	2004	Q3	0.3	1.8	11.3	2.6	.	0.7	31.1	.	.	26.9	.	6.9	18.3	0.1	6298
LT	2004	Q4	0.2	1.5	11.6	.	.	3.1*	29.8	.	.	27.6	.	6.7	19.5	0.1	6294
LT	2005	Q1	0.3	1.4	10.8	.	.	3.1	30.3	.	.	27.5	.	6.4	20.0	0.1	6385
LT	2005	Q2	0.5	1.7	10.7	.	.	3.5	31.4	.	.	25.8	.	6.8	19.5	0.2	6183
LT	2005	Q3	0.5	1.8	10.4	.	.	3.4	31.7	.	.	26.1	.	6.4	19.4	0.2	6012
LT	2005	Q4	0.3	1.4	9.9	.	.	3.8	31.5	.	.	26.8	.	6.3	19.7	0.2	6142

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Table B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued)*

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
LU	2003	Q2	3.1	16.9	10.1	10.7	1.9	20.6	12.1	.	1.4	4.4	3.7	8.9	4.2	1.9	8895
LU	2004	Q2	5.9	13.0	3.5*	15.3	0.1*	18.2	14.8	.	0.6	2.1	3.9	9.4	11.2*	2.3	11565
LU	2005	Q2	5.8	13.1	9.5*	5.9*	.	17.5	17.9	.	3.8*.	.		9.6	15.8	1.2	12420
LV	2003	Q1	0.2	1.1	15.4	10.1	.	.	37.6	.	.	17.0	.	2.1	16.3	0.0	3218
LV	2003	Q2	0.3	1.4	15.9	10.6	.	.	36.4	.	.	17.1	.	2.6	15.5	0.1	3144
LV	2003	Q3	0.2	0.9	14.2	8.1	.	.	42.3	.	.	15.9	.	2.0	16.3	0.1	3194
LV	2003	Q4	0.3	1.2	16.0	7.3	.	.	42.9	.	.	14.9	.	2.1	15.1	0.2	3161
LV	2004	Q1	0.2	1.0	13.7	6.3	.	.	46.3	.	.	13.6	.	2.0	16.7	0.2	3260
LV	2004	Q2	0.3	1.0	14.7	5.3	.	.	47.7	.	.	11.6	.	2.2	16.9	0.3	3168
LV	2004	Q3	0.2	0.9	13.9	.	.	5.1	47.5	.	.	12.4	.	2.4	17.6	0.2	3258
LV	2004	Q4	0.3	0.7	14.7	.	.	5.1	47.2	.	.	10.5	.	2.3	18.9	0.3	3402
LV	2005	Q1	0.3	0.8	13.7	.	.	5.2	49.3	.	.	11.6	.	1.9	17.0	0.2	3052
LV	2005	Q2	0.4	1.0	15.0	.	.	4.1	48.0	.	.	10.1	.	2.1	19.1	0.3	2994
LV	2005	Q3	0.4	0.8	13.4	.	.	3.9	52.0	.	.	10.1	.	1.9	17.2	0.3	2877
LV	2005	Q4	0.4	0.9	14.8	.	.	4.1	47.5	.	.	10.1	.	2.2	19.7	0.2	2813

Continued on the next page

TABLE B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued*)

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
NL	2003	Q1	1.3	7.8	22.0	.	.	18.4	19.2	0.0	3.9	.	.	3.2	23.8	0.3	62140
NL	2003	Q2	1.2	7.8	21.9	.	.	18.5	19.4	0.0	3.9	.	.	3.0	23.9	0.4	57899
NL	2003	Q3	1.1	7.7	21.9	.	0.0	18.0	19.9	.	.	0.0	3.9	3.0	24.0	0.4	60259
NL	2003	Q4	1.2	7.5	21.7	.	0.0	17.2	20.3	.	.	0.0	3.9	2.9	24.9	0.3	63731
NL	2004	Q1	1.2	7.3	21.5	.	0.0	16.6	20.7	.	.	0.0	3.8	2.9	25.5	0.5	68743
NL	2004	Q2	1.2	7.2	21.4	.	0.0	16.1	21.1	.	0.0*	0.0	3.7	2.8	26.1	0.5	67710
NL	2004	Q3	1.1	7.0	21.3	1.5	0.0	14.1*	21.5	.	.	0.0	3.6	2.2	27.1	0.5	66798
NL	2004	Q4	1.0	6.7	20.7	2.6*	0.0	12.8	22.2	.	.	0.0	3.5	1.9	28.0	0.6	73963
NL	2005	Q1	1.1	6.6	20.9	.	0.0	14.8*	23.3	.	.	0.0	3.2	1.7	27.6	0.7	73670
NL	2005	Q2	1.0	6.5	20.7	.	0.0	15.2	23.2	.	.	0.0	3.1	1.8	27.8	0.7	69488
NL	2005	Q3	0.9	6.5	20.7	.	0.0	15.7	22.9	.	.	0.0	3.2	1.8	27.5	0.7	68924
NL	2005	Q4	1.0	6.5	20.2	.	0.0	16.0	22.8	.	.	0.0	3.2	1.8	27.6	0.8	73393
NO	2003	Q1	0.4	0.2	13.5	.	52.4	.	.	.	3.0	.	.	.	30.1	0.5	16066
NO	2003	Q2	0.4	0.2	12.9	.	52.3	.	.	.	2.9	.	.	.	30.9	0.5	15620
NO	2003	Q3	0.4	0.2	12.8	.	52.1	.	.	.	3.0	.	.	.	31.0	0.5	16124
NO	2003	Q4	0.3	0.2	12.9	.	52.0	.	.	.	2.9	.	.	.	31.2	0.5	16069
NO	2004	Q1	0.4	0.2	12.4	.	52.3	.	.	.	3.0	.	.	.	31.2	0.5	16136
NO	2004	Q2	0.3	0.2	12.3	.	52.1	.	.	.	3.2	.	.	.	31.4	0.5	15900
NO	2004	Q3	0.4	0.2	11.7	.	51.9	.	.	.	3.1	.	.	.	32.3	0.5	15979
NO	2004	Q4	0.4	0.2	11.7	.	51.7	.	.	.	3.1	.	.	.	32.4	0.6	15976
NO	2005	Q1	0.4	0.2	11.5	.	51.8	.	.	.	3.2	.	.	.	32.3	0.5	15836
NO	2005	Q2	0.3	0.2	11.1	.	52.4	.	.	.	3.4	.	.	.	32.2	0.5	15480
NO	2005	Q3	0.3	0.2	11.3	.	52.3	.	.	.	3.3	.	.	.	32.1	0.5	15866
NO	2005	Q4	0.3	0.1	11.2	.	52.6	.	.	.	3.4	.	.	.	31.9	0.5	15944

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Table B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued)*

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
PL	2003	Q1	0.4	0.0	17.5	34.1	.	.	30.8	.	.	.	3.4	.	13.8	.	30130
PL	2003	Q2	0.4	0.1	17.5	34.1	.	.	30.7	.	.	.	3.5	.	13.9	.	30089
PL	2003	Q3	0.4	0.1	17.3	34.7	.	.	30.0	.	.	.	3.6	.	13.9	.	30260
PL	2003	Q4	0.4	0.1	16.7	34.4	.	.	30.3	.	.	.	3.4	.	14.8	.	30308
PL	2004	Q1	0.3	0.0	16.3	34.0	.	.	30.5	.	.	.	3.5	.	15.2	0.1	29876
PL	2004	Q2	0.3	0.0	16.2	34.0	.	.	30.4	.	.	.	3.7	.	15.2	0.2	29785
PL	2004	Q3	0.4	0.1	16.1	.	.	34.0	30.5	.	.	.	3.5	.	15.3	0.2	29873
PL	2004	Q4	0.3	0.1	15.5	.	.	33.6	30.7	.	.	.	3.5	.	16.0	0.2	29669
PL	2005	Q1	0.3	0.1	15.3	.	.	33.8	30.5	.	.	.	3.7	.	16.2	0.2	29783
PL	2005	Q2	0.3	0.1	15.0	.	.	34.0	30.5	.	.	.	3.7	.	16.2	0.3	28956
PL	2005	Q3	0.3	0.1	14.8	.	.	33.8	30.6	.	.	.	3.6	.	16.6	0.3	28757
PL	2005	Q4	0.2	0.1	14.1	.	.	33.6	30.9	.	.	.	3.7	.	17.1	0.3	29372
PT	2003	Q1	8.3	57.0	12.9	.	11.6	.	.	.	.	.	.	2.3	7.1	0.8	24058
PT	2003	Q2	8.1	57.0	12.6	.	11.7	.	.	.	.	.	.	2.4	7.4	0.7	23968
PT	2003	Q3	7.9	56.1	13.0	.	11.8	.	.	.	.	.	.	2.5	7.9	0.7	24028
PT	2003	Q4	7.6	54.6	13.4	.	12.3	.	.	.	.	.	.	2.6	8.7	0.7	25723
PT	2004	Q1	6.8	55.1	13.5	.	11.8	.	.	.	0.5	.	.	2.5	9.2	0.6	26431
PT	2004	Q2	6.8	53.9	14.0	.	12.2	.	.	.	0.5	.	.	2.5	9.4	0.7	26590
PT	2004	Q3	6.7	53.9	14.3	.	12.2	.	.	.	0.5	.	.	2.4	9.3	0.7	25889
PT	2004	Q4	6.2	53.5	14.6	.	12.3	.	.	.	0.5	.	.	2.6	9.6	0.6	25965
PT	2005	Q1	6.1	53.5	14.6	.	12.7	.	.	.	0.5	.	.	2.5	9.5	0.6	25800
PT	2005	Q2	6.0	53.1	14.7	.	13.0	.	.	.	0.6	.	.	2.5	9.5	0.7	25185
PT	2005	Q3	5.7	53.0	14.6	.	13.2	.	.	.	0.6	.	.	2.5	9.6	0.8	24544
PT	2005	Q4	5.5	52.5	15.0	.	13.3	.	.	.	0.6	.	.	2.4	10.0	0.7	24394

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TABLE B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued*)

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
SE	2003	Q1	.	7.7	10.4	.	48.7	.	.	.	6.1	.	.	8.7	17.6	0.9	44606
SE	2003	Q2	.	7.6	10.4	.	48.7	.	.	.	6.1	.	.	8.8	17.6	0.9	43911
SE	2003	Q3	.	7.4	10.3	.	48.9	.	.	.	6.3	.	.	8.7	17.5	0.9	43563
SE	2003	Q4	.	7.3	10.5	.	48.7	.	.	.	6.3	.	.	8.7	17.6	0.9	43816
SE	2004	Q1	.	7.1	10.3	.	48.5	.	.	.	6.3	.	.	8.6	18.2	1.0	41633
SE	2004	Q2	.	6.8	10.2	.	48.5	.	.	.	6.3	.	.	8.8	18.3	1.0	40079
SE	2004	Q3	.	6.6	10.2	.	48.6	.	.	.	6.3	.	.	8.9	18.4	1.0	39640
SE	2004	Q4	.	6.7	10.4	.	48.1	.	.	.	6.4	.	.	9.0	18.3	1.0	31627
SE	2005	Q1	.	6.4	10.4	.	48.4	.	.	.	6.4	.	.	9.0	18.3	1.0	27016
SE	2005	Q2	.	6.6	10.0	.	47.9	.	.	.	6.1	.	.	9.0	19.4	1.0	30356
SE	2005	Q3	.	6.4	10.1	.	47.7	.	.	.	6.3	.	.	9.0	19.6	1.0	34717
SE	2005	Q4	.	6.4	9.8	.	47.9	.	.	.	6.3	.	.	8.9	19.6	0.9	36944
SI	2003	Q1	0.5	3.0	19.3	.	.	.	.	59.6	.	.	.	8.6	8.0	1.0	11866
SI	2003	Q2	0.3	3.1	18.2	.	.	.	.	60.7	.	.	.	8.8	7.9	1.1	11601
SI	2003	Q3	0.4	2.7	18.6	.	.	.	.	61.0	.	.	.	8.7	7.5	1.1	11665
SI	2003	Q4	0.4	2.9	18.2	.	.	.	.	60.2	.	.	.	8.8	8.4	1.2	11582
SI	2004	Q1	0.4	2.7	17.7	.	.	.	.	60.7	.	.	.	9.1	8.3	1.1	11379
SI	2004	Q2	0.4	2.7	17.6	.	.	.	.	60.5	.	.	.	9.5	8.2	1.1	11029
SI	2004	Q3	0.4	2.5	16.9	.	.	.	.	60.8	.	.	.	9.3	8.8	1.4	11099
SI	2004	Q4	0.4	2.4	17.3	.	.	.	.	60.6	.	.	.	9.2	8.9	1.4	10781
SI	2005	Q1	0.4	2.3	18.2	.	.	.	.	59.2	.	.	.	9.1	9.4	1.4	10734
SI	2005	Q2	0.3	2.0	17.1	.	.	.	.	60.5	.	.	.	9.7	9.0	1.4	10352
SI	2005	Q3	0.4	2.1	16.8	.	.	.	.	60.2	.	.	.	9.9	9.0	1.6	10246
SI	2005	Q4	0.4	1.9	16.7	.	.	.	.	60.7	.	.	.	9.8	9.1	1.4	10297

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TABLE B.3: Distribution of educational attainment in the quarterly EU-LFS 2003–2005 according to ISCED 97, % (*continued)*

Country	Year	Quarter	EU-LFS ISCED categories													N
			< 1	1	2	3Cs	3	3Cl	3AB	3 or 4	4	4AB	4C	5B	5A	6	
SK	2003	Q1	0.2	0.4	12.7	38.9	.	.	36.5	.	.	.	.	0.7	10.5	0.1	15459
SK	2003	Q2	0.1	0.4	12.8	38.2	.	.	36.8	.	.	.	.	0.6	10.9	0.1	15532
SK	2003	Q3	0.1	0.4	12.8	37.9	.	.	36.8	.	.	.	.	0.6	11.3	0.1	15433
SK	2003	Q4	0.2	0.4	12.7	37.5	.	.	37.0	.	.	.	.	0.6	11.7	0.1	15454
SK	2004	Q1	0.2	0.4	12.7	37.0	.	.	37.2	.	.	.	.	0.6	11.8	0.1	15244
SK	2004	Q2	0.2	0.4	12.7	36.8	.	.	37.1	.	.	.	.	0.6	12.1	0.1	15261
SK	2004	Q3	0.3	0.4	12.1	.	.	37.2	37.3	.	.	.	.	0.6	12.1	0.1	15279
SK	2004	Q4	0.3	0.4	12.0	.	.	36.5	37.8	.	.	.	.	0.7	12.2	0.1	15440
SK	2005	Q1	0.3	0.5	11.7	.	.	35.8	38.3	.	.	.	.	0.8	12.6	0.1	15477
SK	2005	Q2	0.3	0.5	11.6	.	.	35.6	38.1	.	.	.	.	0.8	13.0	0.1	15508
SK	2005	Q3	0.2	0.4	11.3	.	.	35.8	38.3	.	.	.	.	0.9	12.9	0.2	15508
SK	2005	Q4	0.2	0.5	11.1	.	.	35.2	38.4	.	.	.	.	0.9	13.5	0.2	15528
UK	2005	Q1	0.2	.	15.0	13.9	8.6	18.2	14.6	.	.	0.1	.	8.9	19.6	0.9	62465
UK	2005	Q2	0.2	.	14.7	13.9	8.7	18.2	14.7	.	.	0.1	.	8.8	19.7	0.9	61658
UK	2005	Q3	0.2	.	14.5	13.7	8.5	18.4	14.8	.	.	0.1	.	8.8	20.0	0.9	61211
UK	2005	Q4	0.2	.	14.4	13.5	8.5	18.5	15.0	.	.	0.1	.	8.7	20.2	0.9	61035

Source: EU-LFS 2003–2005, quarterly files from Eurostat. Respondents aged 25-64. Weighted using the quarterly weighting factor (*coeff*).
Note: $*$ = Statistically significant ($p \leqslant 0.05$) change in category size compared to the previous quarter

TABLE B.4: Distribution of educational attainment in the ESS, EU-SILC and EU-LFS 2002–2007 compared in %

Country	Year	Survey	EU-SILC ISCED categories						N
			< 1	1	2	3	4	5 & 6	
AT	2003	EU-LFS	.	.	21.7	56.1	6.9	15.2	27760
AT	2004	EU-LFS	.	.	23.4	49.5	8.7	18.4	27003
AT	2004	EU-SILC	.	6.8	18.9	47.7	10.5	16.0	6330
AT	2005	ESS	1.2	15.0	47.3	20.9	6.2	9.4	1494
AT	2005	EU-LFS	.	.	23.4	50.5	8.5	17.6	28136
AT	2005	EU-SILC	.	0.7	17.8	51.6	9.8	20.1	7187
AT	2006	EU-SILC	.	1.1	17.6	52.6	9.2	19.5	8026
AT	2007	ESS	0.5	14.0	48.8	17.2	9.9	9.6	1587
BE	2002	ESS	1.3	8.4	18.6	38.1	.	33.6	1186
BE	2003	EU-LFS	.	18.1	20.5	32.0	1.1	28.2	15174
BE	2004	ESS	0.8	8.1	17.2	39.4	.	34.5	1161
BE	2004	EU-LFS	.	16.6	19.8	32.6	1.2	29.8	15705
BE	2004	EU-SILC	5.1	9.5	15.1	33.9	2.5	33.9	6773
BE	2005	EU-LFS	5.7	9.8	19.1	32.7	2.0	30.7	15449
BE	2005	EU-SILC	5.3	8.6	14.5	32.8	2.6	36.1	6467
BE	2006	ESS	0.5	18.8	5.8	12.2	26.6	36.0	1141
BE	2006	EU-SILC	4.9	8.1	13.7	32.4	3.3	37.6	7688
CY	2003	EU-LFS	5.2	19.6	10.5	32.5	2.8	29.5	5649
CY	2004	EU-LFS	4.3	19.6	11.7	32.0	2.9	29.4	5583
CY	2005	EU-LFS	2.9	19.4	12.4	34.6	3.0	27.8	5222
CY	2005	EU-SILC	3.0	17.3	10.3	36.5	2.7	30.1	5978
CY	2006	EU-SILC	3.1	16.8	10.0	36.5	2.9	30.8	5744
CZ	2002	ESS	0.3	.	7.1	77.5	2.9	12.2	824
CZ	2003	EU-LFS	0.2	0.1	13.2	73.2	1.4	11.9	33815
CZ	2004	ESS	0.4	.	9.3	78.1	2.8	9.4	2012
CZ	2004	EU-LFS	0.1	0.1	14.0	71.9	1.6	12.3	35097
CZ	2005	EU-LFS	0.1	0.1	9.9	75.0	1.7	13.1	34950
CZ	2005	EU-SILC	.	0.3	9.4	75.1	1.8	13.5	5742
CZ	2006	EU-SILC	0.2	0.1	9.1	76.1	1.2	13.3	9767
DE	2003	ESS	.	1.1	5.7	60.9	6.4	25.9	1961
DE	2003	EU-LFS	.	2.6	13.9	53.4	5.9	24.3	173666
DE	2004	ESS	.	1.5	6.3	58.9	6.8	26.4	1870
DE	2004	EU-LFS	.	2.4	13.7	52.7	6.1	25.1	170586
DE	2005	EU-LFS	.	3.2	13.7	51.9	6.6	24.6	64391
DE	2005	EU-SILC	.	1.2	7.7	43.4	8.8	39.0	16321
DE	2006	ESS	.	0.9	4.6	49.9	12.5	32.0	1894
DE	2006	EU-SILC	.	2.5	12.6	52.0	9.6	23.3	16743

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TABLE B.4: Distribution of educational attainment in the ESS, EU-SILC and EU-LFS 2002–2007 in % (*continued)*

Country	Year	Survey	EU-SILC ISCED categories						N
			< 1	1	2	3	4	5 & 6	
DK	2002	ESS	0.1	0.3	15.8	49.1	13.6	21.0	1050
DK	2003	EU-LFS	0.7	0.2	18.7	48.4	0.1	31.8	8822
DK	2004	ESS	0.3	0.5	13.4	37.8	15.9	32.2	1032
DK	2004	EU-LFS	1.0	0.3	17.2	49.0	0.0	32.4	8823
DK	2004	EU-SILC	.	0.5	26.0	46.4	0.1	27.1	9706
DK	2005	EU-LFS	1.1	0.2	17.6	48.1	0.0	32.9	8334
DK	2005	EU-SILC	.	0.3	25.3	46.0	0.1	28.3	8477
DK	2006	ESS	0.4	0.9	12.9	35.4	13.5	36.9	1044
DK	2006	EU-SILC	.	0.3	24.9	45.6	0.1	29.0	8026
EE	2003	EU-LFS	0.2	0.8	17.0	42.2	9.4	30.3	2518
EE	2004	ESS	0.1	0.7	9.1	46.3	8.7	35.2	1190
EE	2004	EU-LFS	0.3	0.7	17.1	41.6	8.9	31.4	2365
EE	2004	EU-SILC	0.3	1.1	10.4	49.0	8.8	30.5	5525
EE	2005	EU-LFS	0.4	0.3	10.4	48.2	7.1	33.5	2300
EE	2005	EU-SILC	0.2	0.9	9.8	47.9	10.8	30.3	5783
EE	2006	EU-SILC	0.2	0.7	10.1	48.0	9.8	31.2	7705
EE	2007	ESS	0.0	0.2	11.7	44.0	17.9	26.3	901
ES	2002	ESS	10.8	18.1	21.4	21.0	9.0	19.7	1047
ES	2003	EU-LFS	1.4	28.5	27.3	17.6	0.1	25.0	93380
ES	2004	ESS	15.8	15.7	24.4	17.7	1.3	25.1	1064
ES	2004	EU-LFS	1.3	26.8	26.9	18.5	0.1	26.4	94217
ES	2004	EU-SILC	2.3	19.3	29.4	20.6	0.2	28.2	20827
ES	2005	EU-LFS	1.0	23.5	27.1	20.1	0.1	28.2	83634
ES	2005	EU-SILC	2.1	26.6	21.2	20.2	1.9	28.1	19946
ES	2006	ESS	7.3	18.9	26.6	22.9	1.2	23.2	1233
ES	2006	EU-SILC	2.1	24.0	22.9	20.7	1.4	28.9	18656
FI	2002	ESS	0.3	12.2	16.2	37.6	.	33.6	1305
FI	2003	EU-LFS	.	14.3	10.2	42.5	0.2	32.8	21701
FI	2004	ESS	0.2	9.9	12.5	38.8	.	38.7	1314
FI	2004	EU-LFS	.	12.9	9.6	43.3	0.3	34.0	21501
FI	2004	EU-SILC	.	.	21.5	44.1	0.3	34.0	16043
FI	2005	EU-LFS	.	11.1	9.8	44.3	0.3	34.5	21039
FI	2005	EU-SILC	.	.	20.4	44.3	0.3	35.1	15879
FI	2006	ESS	1.2	9.1	10.6	38.8	.	40.2	1218
FI	2006	EU-SILC	.	.	19.9	43.2	0.4	36.5	15111
FR	2003	ESS	6.2	12.6	30.3	3.5	17.2	30.2	996
FR	2003	EU-LFS	1.2	14.4	19.5	41.3	0.1	23.5	43945
FR	2004	EU-LFS	1.3	13.9	19.6	41.2	0.1	23.9	44453
FR	2004	EU-SILC	16.1	8.9	7.5	43.0	1.4	23.2	12801
FR	2005	ESS	5.7	11.4	29.9	5.8	16.7	30.6	1215
FR	2005	EU-LFS	1.1	13.3	19.2	41.7	0.1	24.6	44098
FR	2005	EU-SILC	15.1	8.9	7.1	43.1	1.4	24.3	12474
FR	2006	ESS	6.8	8.9	32.8	2.7	18.1	30.7	1412
FR	2006	EU-SILC	14.7	8.2	7.2	43.3	1.5	25.0	12759

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TABLE B.4: Distribution of educational attainment in the ESS, EU-SILC and EU-LFS 2002–2007 in % (*continued)*

Country	Year	Survey	EU-SILC ISCED categories						N
			< 1	1	2	3	4	5 & 6	
GR	2003	ESS	5.0	26.4	19.1	31.9	4.8	12.9	1555
GR	2003	EU-LFS	1.1	33.2	12.3	28.1	6.7	18.6	38463
GR	2004	EU-LFS	0.9	29.6	13.3	27.6	8.1	20.6	42823
GR	2004	EU-SILC	0.7	30.1	11.5	31.2	5.3	21.2	8887
GR	2005	ESS	2.8	27.1	17.2	31.6	7.1	14.2	1481
GR	2005	EU-LFS	0.8	28.6	13.5	28.4	8.2	20.5	41447
GR	2005	EU-SILC	0.6	28.9	11.2	31.5	5.6	22.2	7731
GR	2006	EU-SILC	0.5	29.1	11.8	31.5	5.7	21.4	7902
HU	2002	ESS	3.6	20.5	33.7	25.7	.	16.6	1099
HU	2003	EU-LFS	.	2.2	23.8	57.2	1.6	15.2	47626
HU	2004	EU-LFS	.	2.1	22.8	56.8	1.7	16.6	44713
HU	2005	ESS	1.4	14.7	23.8	32.7	3.0	24.4	1033
HU	2005	EU-LFS	.	1.9	22.1	57.2	1.9	17.0	42082
HU	2005	EU-SILC	0.6	1.6	22.0	58.5	0.6	16.8	9702
HU	2006	ESS	0.0	22.9	32.7	27.8	1.5	15.0	961
HU	2006	EU-SILC	0.2	2.8	17.1	58.3	3.2	18.4	10757
IE	2003	ESS	2.9	14.4	24.3	23.7	19.1	15.5	1413
IE	2003	EU-LFS	0.6	18.5	19.4	23.0	11.7	26.8	50386
IE	2004	EU-LFS	0.6	17.7	18.8	24.2	10.5	28.3	43332
IE	2004	EU-SILC	0.9	20.3	20.9	21.3	9.4	27.3	6745
IE	2005	ESS	2.9	13.7	21.2	28.1	17.9	16.1	1559
IE	2005	EU-LFS	0.5	16.7	18.2	24.6	10.9	29.0	45645
IE	2005	EU-SILC	0.7	19.6	20.5	20.9	9.7	28.6	7295
IE	2006	EU-SILC	0.6	18.7	20.1	20.6	9.8	30.2	6800
IE	2007	ESS	3.5	8.2	19.2	22.5	23.2	23.4	1137
IS	2003	EU-LFS	.	4.2	35.9	28.0	3.3	28.6	2265
IS	2004	EU-LFS	.	3.4	36.5	29.5	2.7	27.9	2198
IS	2004	EU-SILC	.	1.7	30.8	36.8	7.9	22.8	4401
IS	2005	ESS	.	2.1	22.0	9.4	28.4	38.1	341
IS	2005	EU-LFS	.	2.2	34.3	30.4	2.1	31.0	2057
IS	2005	EU-SILC	.	1.2	29.2	35.9	9.2	24.6	4375
IS	2006	EU-SILC	.	1.0	28.4	34.9	9.1	26.7	4309
IT	2003	ESS	1.3	15.4	35.5	38.0	1.8	7.9	855
IT	2003	EU-LFS	2.3	16.4	34.4	34.7	1.4	10.8	106393
IT	2004	EU-LFS	2.7	16.0	33.1	35.6	1.2	11.4	93722
IT	2004	EU-SILC	3.1	15.9	33.1	32.5	4.1	11.3	34586
IT	2005	EU-LFS	2.4	15.3	32.6	36.7	1.1	11.9	96044
IT	2005	EU-SILC	1.8	15.5	32.8	31.6	5.4	13.0	31286
IT	2006	ESS	0.7	11.9	32.5	39.7	0.9	14.4	1022
IT	2006	EU-SILC	1.8	13.7	33.1	31.5	6.4	13.5	30196

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TABLE B.4: Distribution of educational attainment in the ESS, EU-SILC and EU-LFS 2002–2007 in % (*continued)*

Country	Year	Survey	EU-SILC ISCED categories						N
			< 1	1	2	3	4	5 & 6	
LT	2003	EU-LFS	.	2.7	14.7	30.7	28.6	23.3	6362
LT	2004	EU-LFS	0.3	1.9	13.4	32.3	27.9	24.4	6257
LT	2005	EU-LFS	0.5	1.7	10.7	34.9	25.8	26.5	6183
LT	2005	EU-SILC	0.3	1.6	9.9	35.6	27.4	25.3	6299
LT	2006	EU-SILC	0.5	1.4	9.6	34.9	27.2	26.5	6234
LU	2003	ESS	0.7	24.2	9.2	38.9	2.4	24.7	910
LU	2003	EU-LFS	3.1	16.9	20.9	34.6	9.5	14.9	8895
LU	2004	ESS	2.7	23.4	12.1	36.0	4.4	21.4	1116
LU	2004	EU-LFS	5.9	13.0	18.8	33.0	6.5	22.9	11559
LU	2004	EU-SILC	0.4	26.2	10.0	37.1	2.6	23.7	5414
LU	2005	EU-LFS	5.8	13.1	15.3	35.5	3.8	26.6	12420
LU	2005	EU-SILC	0.3	25.0	10.2	36.7	2.5	25.2	5445
LU	2006	EU-SILC	0.5	24.5	10.1	36.5	2.8	25.6	5784
LV	2003	EU-LFS	0.3	1.4	26.5	36.4	17.1	18.2	3144
LV	2004	EU-LFS	0.3	1.0	20.0	47.7	11.6	19.4	3168
LV	2005	EU-LFS	0.4	1.0	15.0	52.1	10.1	21.5	2994
LV	2005	EU-SILC	0.8	12.4	4.1	50.6	12.3	19.9	4816
LV	2006	EU-SILC	0.2	0.8	14.0	51.9	11.6	21.5	5411
NL	2002	ESS	0.5	4.4	33.6	30.6	6.4	24.5	1721
NL	2003	EU-LFS	1.2	7.8	21.9	38.0	3.9	27.3	57899
NL	2004	ESS	0.4	5.6	30.0	29.4	6.9	27.6	1338
NL	2004	EU-LFS	1.2	7.2	21.4	37.1	3.7	29.3	67710
NL	2005	EU-LFS	1.0	6.5	20.7	38.3	3.1	30.3	69488
NL	2005	EU-SILC	0.4	6.1	20.9	37.6	3.3	31.7	12882
NL	2006	ESS	1.0	4.8	25.5	30.7	9.2	28.9	1338
NL	2006	EU-SILC	0.4	5.9	21.0	37.8	3.6	31.3	12771
NO	2002	ESS	0.1	0.1	9.3	53.8	2.9	33.9	1470
NO	2003	EU-LFS	0.4	0.2	12.9	52.3	2.9	31.4	15620
NO	2004	ESS	0.2	.	16.4	31.9	8.9	42.6	1257
NO	2004	EU-LFS	0.3	0.2	12.3	52.1	3.2	32.0	15900
NO	2004	EU-SILC	2.7	0.1	10.3	53.5	3.1	30.4	8583
NO	2005	EU-LFS	0.3	0.2	11.1	52.4	3.4	32.7	15480
NO	2005	EU-SILC	0.2	0.1	9.8	54.7	3.1	32.0	8252
NO	2006	ESS	0.3	.	11.1	33.0	11.1	44.3	1211
NO	2006	EU-SILC	0.1	0.1	21.4	42.5	3.2	32.7	7687
PL	2002	ESS	0.7	17.1	33.7	27.2	5.2	16.0	1311
PL	2003	EU-LFS	0.4	0.1	51.5	30.7	3.5	13.9	30089
PL	2004	ESS	0.5	14.7	34.5	30.4	5.9	14.0	1116
PL	2004	EU-LFS	0.3	0.0	50.2	30.4	3.7	15.3	29785
PL	2005	EU-LFS	0.3	0.1	15.0	64.4	3.7	16.5	28956
PL	2005	EU-SILC	0.6	14.7	0.0	64.1	3.8	16.8	24785
PL	2006	ESS	0.3	16.4	35.2	28.7	4.6	14.7	1084
PL	2006	EU-SILC	0.6	13.7	0.0	63.9	4.3	17.6	22871

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TABLE B.4: Distribution of educational attainment in the ESS, EU-SILC and EU-LFS 2002–2007 in % (*continued)*

Country	Year	Survey	EU-SILC ISCED categories						N
			< 1	1	2	3	4	5 & 6	
PT	2002	ESS	5.9	53.8	15.4	16.5	.	8.5	938
PT	2003	EU-LFS	8.1	57.0	12.6	11.7	.	10.5	23968
PT	2004	EU-LFS	6.8	53.9	14.0	12.2	0.5	12.6	26590
PT	2004	EU-SILC	6.8	52.3	14.8	12.3	0.0	13.8	7444
PT	2005	ESS	4.6	55.6	13.3	15.4	.	11.1	1223
PT	2005	EU-LFS	6.0	53.1	14.7	13.0	0.6	12.7	25185
PT	2005	EU-SILC	5.7	53.2	14.5	13.2	0.2	13.2	6727
PT	2006	EU-SILC	5.1	53.4	14.7	13.6	0.4	12.8	6376
PT	2007	ESS	4.5	52.9	14.3	16.1	.	12.3	1363
SE	2002	ESS	0.3	16.3	24.2	20.9	.	38.3	1354
SE	2003	EU-LFS	.	7.6	10.4	48.7	6.1	27.2	43911
SE	2004	ESS	0.9	16.8	21.3	22.9	.	38.1	1285
SE	2004	EU-LFS	.	6.8	10.2	48.5	6.3	28.1	40079
SE	2004	EU-SILC	.	6.6	8.6	46.0	6.9	31.8	7346
SE	2005	EU-LFS	.	6.6	10.0	47.9	6.1	29.5	30356
SE	2005	EU-SILC	.	5.1	8.7	46.3	7.6	32.3	7894
SE	2006	ESS	0.8	4.0	15.0	37.5	.	42.6	1276
SE	2006	EU-SILC	.	5.4	9.1	46.4	6.3	32.8	8891
SI	2002	ESS	3.6	18.6	26.6	30.9	7.3	13.0	988
SI	2003	EU-LFS	0.3	3.1	18.2	60.7	.	17.7	11601
SI	2004	ESS	2.2	16.0	27.6	33.3	6.4	14.6	881
SI	2004	EU-LFS	0.4	2.7	17.6	60.5	.	18.8	11029
SI	2005	EU-LFS	0.3	2.0	17.1	60.5	.	20.0	10352
SI	2005	EU-SILC	0.5	20.1	2.6	59.1	6.0	11.7	15839
SI	2006	ESS	1.8	16.4	26.6	29.8	6.8	18.6	945
SI	2006	EU-SILC	0.4	13.5	7.6	59.9	4.0	14.6	18228
SK	2003	EU-LFS	0.1	0.4	51.1	36.8	.	11.6	15532
SK	2004	ESS	0.8	.	10.2	72.1	3.5	13.4	951
SK	2004	EU-LFS	0.2	0.4	49.5	37.1	.	12.8	15261
SK	2005	EU-LFS	0.3	0.5	11.6	73.7	.	13.9	15508
SK	2005	EU-SILC	0.1	0.1	7.4	74.9	.	17.5	8604
SK	2006	EU-SILC	0.1	0.3	6.0	75.1	.	18.5	8285
SK	2007	ESS	.	1.5	9.7	70.7	3.7	14.4	1132
UK	2002	ESS	0.1	0.5	47.5	12.9	11.6	27.5	1364
UK	2005	EU-LFS	0.2	.	28.6	41.6	0.1	29.5	61658
UK	2005	EU-SILC	0.1	.	19.6	39.3	5.8	35.3	12319
UK	2006	ESS	.	0.2	40.3	11.4	10.8	37.2	1543
UK	2006	EU-SILC	0.2	.	23.5	37.5	3.7	35.1	11253

Sources: ESS 2002–2007, EU-SILC 2004–2006, cross-sectional files from Eurostat, EU-LFS 2003–2005, files from Eurostat (second quarter used only). Own calculations. Respondents aged 25–64. Weighted using the design weight (*dweight*) in the ESS, the cross-sectional weighting factor (*pb040*) in EU-SILC and the quarterly weighting factor (*coeff*) in the EU-LFS.

TABLE B.5: Distribution of educational attainment in the first three ESS rounds 2002–2007, corrected variable *edulvl* in %

Country	ESS round	ESS ISCED categories						N
		< 1	1	2	3	4	5 & 6	
BE	1	1.3	8.4	18.6	38.1	.	33.6	1186
BE	2	0.8	8.1	17.2	39.4	.	34.5	1161
BE	3	0.5	7.0	17.6	38.8	.	36.0	1141
BG	3	1.6	2.7	21.1	50.4	6.3	17.9	898
CH	1	0.2	0.6	9.8	57.9	.	31.5	1460
CH	2	0.1	1.5	8.8	58.6	.	31.0	1502
CH	3[c]	1.0*	3.6*	6.6	55.8	4.3	28.7	1249
CY	3	0.5	10.4	11.1	50.7	.	27.2	684
CZ	1	0.1	0.2	7.1	77.5	.	15.1	824
CZ	2	0.2	0.2	9.3	78.1	.	12.3*	2012
DE	1	0.1	0.9	8.7	53.3	3.4	33.5	1958
DE	2	0.2	1.2	8.0	51.5	2.7	36.4	1870
DE	3[c]	0.1	0.8	8.2	57.1*	2.4	31.3*	1897
DK	1	0.1	0.3	15.8	49.1	.	34.7	1050
DK	2[c]	0.3	0.5	13.4	37.8*	.	48.1*	1032
DK	3	0.4	0.9	12.9	35.4	.	50.4	1044
EE	2	0.1	0.7	9.1	46.3	8.7	35.2	1190
EE	3[c]	0.0	0.2	11.7	44.0	4.8*	39.4*	901
ES	1	10.8	18.1	21.4	21.0	8.4	20.3	1047
ES	2[c]	15.8*	8.1*	28.0*	13.2*	8.6	26.3*	1064
ES	3	7.3*	13.4*	25.9	17.9*	11.1	24.4	1233
FI	1	0.3	12.2	16.2	37.6	.	33.6	1305
FI	2	0.2	9.9	12.5*	38.8	.	38.7*	1314
FI	3	1.2*	9.1	10.6	38.8	.	40.2	1218
FR	1	2.2	11.9	11.9	43.7	.	30.2	996
FR	2	2.6	10.4	12.8	43.7	.	30.6	1215
FR	3[c]	1.6	11.1	9.3*	47.4	.	30.7	1412
GR	1	5.0	26.4	19.1	31.9	.	17.6	1555
GR	2[c]	2.8*	27.1	17.2	31.7	.	21.1*	1477
HU	1	1.3	2.4	23.2	56.6	.	16.6	1099
HU	2[c]	0.4	1.0*	14.7*	49.2*	7.3	27.5*	1033
HU	3	0.6	1.3	23.9*	51.0	6.1	17.1*	961
IL	1	1.8	0.9	13.4	35.5	.	48.4	1547
IS	2	0.0	2.1	22.0	37.8	.	38.1	341
IT	1	1.3	15.4	35.5	38.0	.	9.8	855
IT	2[c]	0.7	11.9*	32.5	39.7	0.9	14.4*	1022
LU	1	0.7	24.2	7.8	40.3	2.4	24.7	910
LU	2	2.7*	23.4	10.7*	37.4	4.4*	21.4	1116

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TABLE B.5: Distribution of educational attainment in the first three ESS rounds 2002–2007, corrected variable *edulvl* in % (*continued)*

Country	ESS round	ESS ISCED categories						N
		< 1	1	2	3	4	5 & 6	
NL	1	0.5	4.4	33.6	30.6	6.4	24.5	1721
NL	2	0.4	5.6	30.0	29.4	6.9	27.6	1338
NL	3	1.0	4.8	25.5*	30.7	9.2	28.9	1338
NO	1	0.1	0.1	9.3	53.8	2.9	33.9	1470
NO	2‡	0.2	0.0	16.4*	31.9*	8.9*	42.6*	1257
NO	3	0.3	0.0	11.1*	33.0	11.1	44.3	1211
PL	1	0.4	0.3	18.7	61.2	5.2	14.2	1311
PL	2c	0.1	0.4	14.7*	65.0	5.9	14.0	1116
PL	3	0.2	0.1	16.4	63.9	4.6	14.7	1084
PT	1	5.9	53.8	15.4	13.6	.	11.4	938
PT	2	4.6	55.6	13.3	15.4	.	11.1	1223
PT	3c	4.5	52.9	14.3	16.1	.	12.3	1363
RU	3	0.0	0.9	7.1	32.1	.	59.8	1475
SE	1	0.1	7.1	15.1	49.3	.	28.4	1354
SE	2	0.2	6.5	15.8	48.4	.	29.2	1285
SE	3c	0.8	4.0*	15.0	46.0	.	34.2*	1276
SI	1	1.0	2.6	18.6	57.5	.	20.2	988
SI	2	0.5	1.7	16.0	60.8	.	21.0	881
SI	3	0.5	1.3	16.4	56.4	.	25.4	945
SK	2	0.3	0.5	10.2	72.1	3.5	13.4	951
SK	3	0.2	1.3*	9.7	70.7	3.7	14.4	1132
TR	2	20.5	48.5	8.5	15.2	.	7.2	1244
UK	1	0.1	0.5	20.8	39.5	.	39.1	1364
UK	3	0.0	0.2	18.1	33.5*	.	48.2*	1536

Source: European Social Survey 2002–2007, own calculations. Respondents aged 25-64. Weighted using the design weight (*dweight*). Harmonisation corrected for inconsistencies over time and deviations from ISCED mappings (see Sections 4.2.1 and 5.2.3).
Notes:
c = CSEV changed in this round;
‡ = Data source changed in this round (from register to survey data);
∗ = Statistically significant ($p \leqslant 0.05$) change in category size compared to the previous ESS round

TABLE B.6: Distribution of Educational Attainment in the ESS according to ES-ISCED, %

Country	ESS round	Distribution across ES-ISCED categories, %							N
		I	II	IIIb	IIIa	IV	V1	V2	
BE	1	9.7	18.6	11.9	26.2	17.2	5.1	11.2	1186
BE	2	8.9	17.2	12.3	27.1	18.4	5.3	10.7	1161
BE	3	7.5	17.6	12.2	26.6	19.9	4.5	11.7	1141
CH	1	0.8	14.6	42.7	10.4	19.5	1.1	10.9	1460
CH	2	1.5	14.6	46.3	6.5*	20.5	1.7	8.9	1502
CH	3[c]	4.6	13.5	43.2	6.4	13.8*	7.0*	11.6	1249
CZ	1	0.3	7.1	42.5	35.1	2.9	1.3	10.9	824
CZ	2	0.4	9.3	40.5	37.6	2.8	1.9	7.5*	2012
DE	1	1.0	8.7	46.0	1.5	21.2	8.9	12.6	1958
DE	2	1.4	8.0	44.2	1.9	20.7	11.1	12.6	1870
DE	3[c]	0.9	8.8	49.0*	2.1	17.4*	10.6	11.1	1897
DK	2	0.8	13.4	32.2	5.6	15.9	20.3	11.8	1032
DK	3	1.2	12.9	30.6	4.9	13.5	22.1	14.8*	1044
EE	2	0.8	9.1	16.9	29.4	21.3	20.6	1.9	1190
EE	3[c]	0.2	11.7	15.1	28.9	17.9*	21.9	4.4*	901
ES	1	28.9	29.1	8.4	13.2	0.6	8.3	11.4	1047
ES	2[c]	23.9*	32.0	8.6	9.1*	1.3	10.3	14.7	1064
ES	3	20.7	32.1	11.1	11.8	1.2	8.7	14.5	1233
FR	3	12.7	9.3	29.3	18.1	14.5	9.9	6.3	1412
HU	1	3.6	20.5	33.7	25.7	.	9.2	7.4	1099
HU	2[c]	1.4*	11.8*	26.7*	30.6	5.2	13.4*	11.0*	1033
HU	3	1.8	21.1*	32.7*	25.7	3.7	8.9*	6.1*	961
IL	1	0.8	15.3	14.3	13.8	22.0	20.2	13.6	1547
LU	1	24.9	7.8	26.5	13.8	7.0	13.1	6.9	910
LU	2	26.0	10.7*	25.0	12.4	9.8*	9.7*	6.3	1116
NL	1	4.9	33.6	22.8	14.2	.	16.7	7.8	1721
NL	2	6.0	30.0	21.2	15.1	.	18.9	8.8	1338
NL	3	5.8	25.5*	23.1	16.7	.	18.4	10.5	1338
PL	1	0.7	17.1	33.7	27.2	7.1	2.5	11.6	1311
PL	2[c]	0.5	14.7	34.5	30.4	5.9	2.8	11.2	1116
PL	3	0.3	16.4	35.2	28.7	4.6	2.6	12.1	1084
RU	3	0.9	7.1	12.3	17.0	35.3	2.8	24.6	1475
SK	2	0.8	10.2	32.7	42.9	.	2.1	11.3	951
SK	3	1.5	9.7	34.2	40.2	.	3.3	11.1	1132

Source: European Social Survey 2002–2007, own calculations. Respondents aged 25-64. Weighted using the design weight (*dweight*). *Notes:*
[c] = CSEV changed in this round;
$*$ = Statistically significant ($p \leqslant 0.05$) change in category size compared to the previous ESS round

C

DATA COLLECTION INSTRUMENTS FOR EDUCATIONAL ATTAINMENT IN THE ESS, EU-SILC AND EU-LFS

TABLE C.1: Questionnaire items on educational attainment in the ESS

Country	ESS 1	ESS 2	ESS 3	Translation
AT	Was ist der höchste Bildungsgrad, den Sie erreicht haben?			What is the highest level of education you have achieved?
BE (FL)	Wat is het hoogste opleidingsniveau dat u heeft voltooid?			What is the highest level of education you completed?
BE (FR)	Quel est le plus haut niveau de formation que vous avez terminé ?			What is the highest level of education you completed?
BG	-	-	Каква е вашата най-висока степен на завършено образование?	Which is the highest degree that you hold?
CH (FR)	Quel est le plus haut niveau de formation que vous avez terminé ?			What is the highest level of education you completed?
CH (DE)	Welches ist Ihre höchste abgeschlossene Ausbildung?			What is your highest completed education?
CH (IT)	Quale è il livello di formazione più alto che ha terminato?			What is the highest level of education you have completed?
CY	-	-	Ποιος είναι ο ανώτερος τίτλος σπουδών σας·	What is your highest diploma from education?
CZ	Jaké je Vaše nejvyšší dosažené školní vzdělání?		-	What is your highest formal education?
DE	Was ist der höchste allgemeinbildende Schulabschluss, den Sie haben? Welchen beruflichen Ausbildungsabschluss haben Sie? INT.: MEHRFACHNENNUNGEN MÖGLICH			What is your highest general school certificate? Which vocational education certificate do you have? *Interviewer instruction: multiple responses*
DK	Hvad er den længste uddannelse, du har taget?	Hvad er den højeste uddannelse, du har taget?		ESS 1: What is the longest training you have taken? ESS 2 and 3: What is the highest education you have taken?
EE (EE)	-	Milline on Teie kõige kõrgem omandatud haridustase?		What is the highest level of education you achieved?
EE (RU)	-	Какой самый наивысший уровень Вашего образования.		What is your highest level of education?
ES	¿Cuál es el nivel de estudios más alto que ha obtenido? ANOTAR LITERAL y CODIFICAR. Estudios más altos terminados: [textfield]	¿Cuál es el nivel de estudios más alto que ha obtenido? ENTREVISTADOR: ANOTAR LITERALMENTE Y PRE-CODIFICAR. NOTA PARA CODIFICACIÓN: COMPROBAR QUE LA PRE-CODIFICACIÓN ES CORRECTA. ANOTAR CON TODO DETALLE Y DESPUÉS CODIFICAR. [textfield]		What is the highest level of education you have achieved? *Then follow interviewer instructions to note the response verbatim in all detail, code the response (categories were provided) and check back.* (ESS 1 adds: 'Completed highest education:') [textfield]

Continued on the next page

Table C.1: Questionnaire items on educational attainment in the ESS (*continued*)

Country	ESS 1	ESS 2	ESS 3	Translation
FI (FI)	Mikä on koulutuksenne. Valitkaa kortista x korkein koulutusaste, jonka olette suorittanut?			What is your education? Choose from card x the highest level of education that you have completed.
FI (SE)	Vilken är Er utbildning? Välj på kort x den högsta utbildningsnivån, som Ni slutfört.			What is your education? Choose from card x the highest level of education that you have completed.
FR	Quel est le niveau d'études le plus élevé que vous avez atteint ?			What is the the highest level of education you have achieved?
GR	Ποιος είναι ο ανώτερος τίτλος σπουδών σας·			What is your highest qualification?
HU	Mi az Ön legmagasabb iskolai végzettsége?			What is your highest education?
IE	What is the highest level of education you have completed to date?		What is the highest level of education you have achieved?	-
IS	-	Hvaða námi hefur þú lokið?	-	What is your highest level of education?
IT	Quale è il titolo di studio più elevato che Lei ha conseguito?		-	What is the highest qualification you have achieved?
LU	Quel est le niveau éducatif le plus élevé que vous avez obtenu ?		-	What is the highest level of education you have achieved?
LV (LV)	-	-	Kāds ir augstākais izglītības līmenis, kādu Jūs esat ieguvis?	What is the highest level of education you received?
LV (RU)	-	-	Какой самый высокий уровень полученного Вами образования?	What is the highest level of education you received?
NL	Wat is het hoogste opleidingsniveau dat u heeft voltooid?	Wat is de hoogste opleiding die u heeft voltooid?		What is the highest (ESS 1: level of) education you completed?
NO	not in questionnaire	Hva er din høyeste utdanning?		What is your highest education?
PL	Jakie ma P. wykształcenie?	Jakie ma P. wykształcenie? Chodzi o ukończoną przez P. szkołę najwyższego szczebla.		What is your education? Please select the school of the highest level that you completed.

Continued on the next page

TABLE C.1: Questionnaire items on educational attainment in the ESS (*continued*)

Country	ESS 1	ESS 2	ESS 3	Translation
PT	Qual o grau de escolaridade mais elevado que completou? Se nenhuma das descrições apresentadas no cartão corresponder ao seu caso, por favor, descreva pormenorizadamente o nível de escolaridade que atingiu. ESCREVER DESCRIÇÃO PORMENORIZADA [textfield]			What is the highest level of schooling you completed? If none of the descriptions given on the card correspond to you, please describe in detail the level of schooling reached. *Interviewer instruction to note details* [textfield]
RO	-	-	Care este ultima şcoală pe care aţi absolvit-o ?	What is the last school you graduated from?
RU	-	-	Какой наивысший уровень образования Вы получили? /НЕ ЧИТАТЬ. ВОЗМОЖЕН ОДИН ВЫБОР/	What is the highest level of education you received? *Interviewer instruction: 'Do not read out. One response possible'*
SE	Vilken är din högsta utbildning?	Vilken är din högsta utbildning?		What is your highest education?
SI	Katera je zadnja šola, ki ste jo končali, redno ali izredno?			What is the last school that you completed, in regular education or part-time/adult education?
SK	-	Aké je vaše najvyššie dosiahnuté vzdelanie?		What is your highest educational attainment?
TR	-	Eğitim durumunuz nedir?	-	What is your educational status?
UA (UA)	-	Яким є найвищий рівень освіти, що ви його отримали?		What is the highest level of education you received?
UA (RU)	-	Какой самый высокий уровеньо образования, который Вы получили?		What is the highest level of education you received?
UK	Have you passed any of the examinations on this card? *If 'yes':* What is the highest level of education you have achieved? How old were you when you completed your continuous full-time education?	What is the highest level of education you have achieved?	Have you passed any of the examinations on this card? Please choose the section which your HIGHEST level of education achieved falls into. *The question is asked twice with to different response cards, separately for school and post-school qualifications.* How old were you when you completed your continuous full-time education?	

Source: ESS country questionnaires, available at NSD.

TABLE C.2: Questionnaire items on educational attainment in the EU-SILC

Country	2004	2005	2006	Translation
AT	Was ist der höchste Bildungsabschluss, den Sie erworben haben?			What is the highest educational qualification you have achieved?
BE	Quel est le plus haut diplôme ou le plus haut certificat que vous avez obtenu (jusqu'à présent)?	Quel est le plus haut diplôme ou le plus haut certificat que vous ayez obtenu (jusqu'à présent)?		What is the highest qualification you have achieved up to today?
CY	-	Ποιο είναι το πιο ψηλό επίπεδο μόρφωσης που έχετε ολοκληρώσει·		What is the highest level of education you have completed?
CZ	-			
DE	-	Welchen höchsten allgemeinbildenden Schulabschluss haben Sie? Welchen höchsten beruflichen Ausbildungsabschluss, Fachhochschul- oder Hochschulabschluss haben Sie, und in welchem Jahr haben Sie ihn erworben? Wenn Sie mehrere verschiedene Abschlüsse haben, aber nicht genau wissen, welches der höchste ist, geben Sie bitte alle Abschlüsse sowie das dazugehörige Jahr an.	Welchen höchsten allgemeinbildenden Schulabschluss haben Sie? Welchen höchsten beruflichen Ausbildungsabschluss haben Sie? Wenn Sie mehrere verschiedene Abschlüsse haben, aber nicht genau wissen, welches der höchste ist, geben Sie bitte alle Abschlüsse sowie das dazugehörige Jahr an.	What is your highest general school certificate? What is your highest vocational education certificate? If you have several different certificates, but don't know which one is the highest, please indicate all certificates as well as the year of achieving it. *(In 2005, the second question is: What is your highest vocational certificate, polytechnic college or university degree and in which year did you attain it?)*
DK	register data used			

Continued on the next page

TABLE C.2: Questionnaire items on educational attainment in the EU-SILC (*continued*)

Country	2004	2005	2006	Translation
EE	Milline on Teie kõrgeim lõpetatud kutse-, ameti- või eriala haridus? Millise hariduse omandasite üldhariduskoolis (või teist liiki õppeasutuses üldhariduse õppekava raames)?			What is Your highest completed vocational, occupational or professional education? What kind of education did You attain in the school of general education (or in any other educational establishment in the framework of the general education curriculum)?
ES	¿Cuál es el mayor nivel de formación que ha alcanzado? (Entrevistador, si fuera necesario, dígale que precise lo más posible, por ejemplo: ha asistido menos de cinco años a la escuela; sexto curso de Bachilleratoy Reválida, sistema antiguo; tres cursos completos de Ciencias Económicasy Empresariales; doctorado en Ciencias Sociales; FPI oficial industrial, etc.).			What is the highest level of training you have reached? (Interviewer, if necessary ask respondent to specify as many as possible, for example have attended less than 5 years school, 6 year secondary, old system, three complete courses of economics and business studies, doctorate in social sciences, FP1 industrial professional training, etc.)
FI	register data used			
FR	Quel est le diplôme le plus élevé que vous avez obtenu selon la classification internationale suivante ?			Which is the highest qualification you have achieved in the following international classification?
GR	Ποιο είναι το υψηλότερο επίπεδο στοιχειώδους, δευτεροβάθμιας, ανώτερης ή ανώτατης εκπαίδευσης που έχετε ολοκληρώσει·			What is the highest level of education you have actually completed?
HU	-	*questionnaire item not identified*	Mi a legmagasabb iskolai végzettsége?	What is your highest education?
IE	What is the highest level of education or training you have attained? IF THE HIGHEST LEVEL OF EDUCATION THE RESPONDENT HAS ATTAINED IS LOWER SECONDARY Please specify level achieved. IF THE HIGHEST LEVEL OF EDUCATION THE RESPONDENT HAS ATTAINED IS HIGHER SECONDARY, Please specify level achieved. IF THE HIGHEST LEVEL OF EDUCATION THE RESPONDENT HAS ATTAINED IS A TECHNICAL/VOCATIONAL QUALIFICATION Please specify level achieved. IF THE HIGHEST LEVEL OF EDUCATION THE RESPONDENT HAS ATTAINED IS HIGHER EDUCATION CERTIFICATE/DIPLOMA Please specify level achieved.			

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TABLE C.2: Questionnaire items on educational attainment in the EU-SILC (*continued*)

Country	2004	2005	2006	Translation
IS	Hefurðu lokið prófi síðan þá? Hefurðu lokið námi eftir skyldunám? Hvaða skólastigi hefurðu lokið? Hvaða námi hefurðu lokið? Hefurðu öðlast meistararéttindi? Laukstu námi úr meistaraskóla? Hvaða prófgráðu hefurðu lokið? Hefurðu lokið lengri starfstengdum námskeiðum? Hvaða námskeið?			(first question not translated) Have you completed studies after compulsory schooling? What level of schooling have you completed? What is your highest level of education? Have you acquired a master tradesman's papers? Did you complete studies at a master tradesmen's college? What examination have you completed? Have you completed any courses which grant job qualification? Which courses? [textfield]
IT	Qual è il più alto titolo di studio da Lei conseguito?			What is the highest educational qualification you have received?
LT	-	Pažymėkite aukščiausią išsilavinimą		Select the highest education
LU	D.31 Quel est le plus haut niveau de formation scolaire ou professionnelle que M. a atteint avec succès (obtention d'un certificat ou d'un diplôme) ?			What is the highest level of education you have successfully achieved (with attainment of a certificate or diploma)?
LV	-	Kāds ir Jūsu augstākais pabeigtais izglītības līmenis?		What is the highest level of education you have completed?
NL	-	*questionnaire item not identified*, maybe register data used?		-
NO	register data used			-
PL	-	Poziom wykształcenia	Najwyższy uzyskany poziom wykształcenia	2005: Level of education; 2006: Highest level of education achieved
PT	Qual o NÍVEL DE ESCOLARIDADE MAIS ELEVADO completado?	Qual o NÍVEL DE ESCOLARIDADE MAIS ELEVADO que completou?		What is the highest level of education you have completed?

Continued on the next page

TABLE C.2: Questionnaire items on educational attainment in the EU-SILC (*continued*)

Country	2004	2005	2006	Translation
SE	Vilken av de utbildningar som är uppräknade på det här svarskortet är din högsta avslutade utbildning? Om mer än folkskola/grundskola menas med avslutad att man har tagit en examen el.dyl. Har du gått eller går du nu på kommunal vuxenutbildning (komvux) inklusive grundvux? If yes: Vilken utbildning var/är det? Har du studerat eller studerar du nu vid universitet/högskola? If yes: Har du examen från universitet/högskola? If yes: Vilken examen?			Which of the training courses listed on this reply card is your highest completed education? If more than elementary school / primary school it completed means having taken an exam (...) Have you been or are you now in municipal adult education including grundvux? If yes: What educational programme was / is it? Have you studied or are you studying, are you now studying at university / college? If yes: Have you graduated from university/college? If yes, what degree?
SI	*questionnaire item not identified*			-
SK	-	Uveďte, aký najvyšší stupeň vzdelania ste dosiahli:	*questionnaire item not identified*	Indicate the highest level of education you have achieved:
UK	-	I would now like to ask you about education and work-related training. Do you have any qualifications ... (INDIVIDUAL PROMPT – CODE ALL THAT APPLY) from school, college or university, connected with work or from government schemes? Which qualifications do (you think) you have, starting with the highest qualifications? (CODE ALL THAT APPLY - PROMPT AS NECESSARY) *Many questions detailing which level of those qualifications follow*		

Source: EU-SILC country questionnaires, provided with the data files by EUROSTAT via EQUALSOC.

Table C.3: Questionnaire items on educational attainment in the EU-LFS

Country	2005	Translation
AT	Was ist Ihre höchste abgeschlossene Schulbildung?	What is your highest completed school education?
BE	Quel est le niveau du diplôme le plus élevé obtenu par M. ?	What is the level of the highest certificate achieved by the respondent?
BG	Каква степен на завършено образование имате? Посочва се най-високата степен	What level of education have you completed? Indicate the highest level.
CH	Was für eine Schule oder Ausbildung haben Sie nach der obligatorischen Schule als ERSTES ABGESCHLOSSEN ? INT.: ABGESCHLOSSEN = mit Diplom oder Abschlusszeugnis! Haben Sie das achte oder neunte Schuljahr abgeschlossen? Wie lange hat diese Berufsausbildung/Schule insgesamt gedauert? Haben Sie NACHHER noch eine weitere Ausbildung ABGESCHLOSSEN ? Um was für eine Ausbildung hat es sich gehandelt ? Haben Sie mit einem Doktorat abgeschlossen?	What kind of school or training have you completed right after compulsory school? (Interviewer: completed=with a diploma or certificate) Have you completed grade 8 or 9? How long did this educational programme take? Have you completed a further educational programme after that? What kind of programme was this? Have you completed your education with a doctorate?
CY	questionnaire item not identified	-
CZ	Jaký je stupeň nejvyššího dosaženého vzdělání respondenta?	What is the respondents' highest level of education?
DE	Haben Sie einen allgemeinen Schulabschluss? Welchen höchsten allgemeinen Schulabschluss haben Sie? Haben Sie einen beruflichen Ausbildungs- oder Hochschul-/Fachhochschulabschluss? Welchen höchsten beruflichen Ausbildungs- oder Hochschul-/Fachhochschulabschluss haben Sie?	Do you have a general school certificate? Which is your highest general school certificate? Do you have a vocational training certificate or university/college degree? What is your highest vocational training certificate or university/college degree?
DK	Hvilken skoleuddannelse har De gennemført? Angiv den højeste. Har De gennemført en uddannelse udover Deres skoleuddannelse? Hvis De har gennemført flere uddannelser, angives kun den højeste. [textfield]	What school education have you completed? Indicate the highest. Have you completed some education in addition to your schooling? If you have completed several courses, only give the highest. [textfield]
EE	Milline on Teie kõrgeim lõpetatud kutse-, ameti- või erialaharidus? Millise hariduse omandasite üldhariduskoolis (või teist liiki õppeasutuses üldhariduse õppekava raames)?	What is your highest level of vocational, occupational or professional education? What kind of school education did You attain (or any other education in the framework of the general education curriculum)?
ES	no Spanish language questionnaire available	What is the highest level of studies that you have completed, and in what speciality? *Interviewer instruction: If the informant provides as a response a course that does not complete a cycle, more information must be obtained to ascertain the level of studies genuinely completed.*

Continued on the next page

TABLE C.3: Questionnaire items on educational attainment in the EU-LFS (*continued*)

Country	2005	Translation
FI	no Finnish language questionnaire available	Have you completed: 1. the matriculation examination or the leaving certificate of upper secondary general school? 2. the comprehensive or middle school? 3. the primary school, lower secondary school, part of middle or comprehensive school? CANNOT SAY. CHOOSE THE HIGHEST ONE COMPLETED. *Questions are not asked about vocational education completed because that information is available from the register of Completed Education and Degrees maintained by Statistics Finland.*
FR	À cette date MMAAAA, quelle classe ou quelle année d'études aviez-vous atteint ? Dans l'enseignement primaire ou secondaire général, quelle est la dernière classe que vous avez suivie ? À ce jour, quel est le plus haut diplôme d'enseignement primaire ou secondaire général que vous ayez obtenu ? Dans l'enseignement secondaire technique ou professionnel, quelle est la dernière année d'études que vous avez suivie ? (sinon, donner le diplôme préparé le plus élevé s'il s'agit de l'année terminale). À ce jour, quel est le plus haut diplôme d'enseignement technique ou professionnel que vous ayez obtenu ? Dans l'enseignement supérieur, quelle est la dernière année d'études que vous avez suivie ? (sinon, donner le diplôme préparé le plus élevé s'il s'agit de l'année terminale). À ce jour, quel est le plus haut diplôme d'enseignement supérieur que vous ayez obtenu ?	Which grade or year of studies have you reached on the date (Month/Year)? In primary or secondary general education, which is the last grade you attended? Up to today, which is the highest educational certificate you obtained in primary or secondary general education? In secondary technical and vocational education, which is the last grade you attended? Up to today, which is the highest educational certificate you obtained in secondary technical and vocational education? In higher education, which is the last grade you attended? Up to today, which is the highest educational certificate you obtained in higher education?
GR	Ποιο είναι το ανώτατο επίπεδο εκπαίδευσης που έχετε επιτυχώς ολοκληρώσει	What is the highest level of education you have successfully completed?
HU	questionnaire item not identified	-
IE	What is the highest level of education or training you have attained? If the highest level of education the respondent has attained is lower secondary, Please specify level achieved (same for higher secondary, a technical/vocational qualification, higher education certificate/diploma)	

Continued on the next page

TABLE C.3: Questionnaire items on educational attainment in the EU-LFS (*continued*)

Country	2005	Translation
IS	Hefurðu lokið námi eftir skyldunám? Hvaða skólastigi hefurðu lokið? Hvaða námi hefurðu lokið? Hefurðu öðlast meistararéttindi? Laukstu námi úr meistaraskóla? Hvaða prófgráðu hefurðu lokið? Hefurðu lokið lengri starfstengdum námskeiðum? Hvaða námskeið? [textfield]	Have you completed studies after compulsory schooling? What level of schooling have you completed? What is your highest level of education? Have you acquired a master tradesman's papers? Did you complete studies at a master tradesmen's college? What examination have you completed? Have you completed any courses which grant job qualification? Which courses? [textfield]
IT	Titolo di studio più alto conseguito	Highest educational qualification achieved
LT	Jūs baigėte (nurodykite aukščiausią išsilavinimą):	You have completed (indicate the highest education/degree):
LU	Quel est le niveau d'enseignement le plus élevé que la personne a achevé? Indiquer le niveau d'enseignement le plus élevé achevé avec succès et/ou le diplôme de fin d'études obtenu	What is the highest level of education the person has successfully achieved? Indicate the highest level of education achieved successfully and/or the leaving certificate obtained
LV	Kāds ir Jūsu līdz šim sekmīgi iegūtais augstākais izglītības līmenis ?	What is the highest level of education you have successfully completed up to now?
NL	Heeft u na de lagere school of de basisschool een opleiding of cursus gevolgd waarmee u langer dan 6 maanden bezig bent geweest? Welke opleiding of cursus heeft u toen als eerste gevolgd? (up to 7) Wat voor soort onderwijs was dit? Welke leerweg heeft u gevolgd? (if VMBO/MBO en leerweg) Was dit een lerarenopleiding? (if HBO/universitaire en leraaropleiding opleiding) Welke akte of graad? Welke examen of welke academische kwalificatien heeft u als laatste gevolgt? Heeft u de akte, het getuigschrift of het diploma behaald? Welk examen of welke academische kwalificatie heeft u als laatste behaald?	Have you, after basic school, followed any education of more than 6 months duration? Which education or course did you follow first? (up to 7 can be mentioned) What kind of education was that? What training have you followed? Was this teacher training? What degree or certificate? Which course have you attended last? Did you achieve the final certificate? Which examination or academic qualifications have you last achieved?
NO	Hvilken allmennutdanning har du fullført? Har du fullført annen utdanning hvor skolegangen eller studiene varer minst 4-5 måneder på heltid? Hvilken utdanning er det du har fullført? Er det videregående skole, teknisk fagskole, høyskole, universitet eller annet? Hvilken utdanning er det du har fullført? Oppgi skoleslag: [textfield]	Which public education have you completed? Have you completed other programs where the school or studies last at least 4-5 months full-time? What education is what you have completed? Is it high school, technical college, college, university or other? What education is what you have completed? Enter school type: [textfield]
PL	Symbol poziomu Ukończonego wykształcenia	Code for the level of education completed

Continued on the next page

Table C.3: Questionnaire items on educational attainment in the EU-LFS (*continued*)

Country	2005	Translation
PT	Qual o nível de escolaridade mais elevado que completou? (incluir cursos com equivalência escolar)	What is the highest level of education you have completed? (including courses with school equivalency)
SE	not in questionnaire	not in questionnaire
SI	no Slovenian language questionnaire available	Your level of education:
SK	not in questionnaire	not in questionnaire
TR	no Turkish language questionnaire available	What is the last educational institution you graduated from?
UK	I would now like to ask you about education and work-related training. Do you have any qualifications… (INDIVIDUAL PROMPT – CODE ALL THAT APPLY) from school, college or university? connected with work? from government schemes? from a Modern Apprenticeship? from having been education at home, when you were of school age? No qualifications? Which qualifications do (you think) you have, starting with the highest qualifications? (CODE ALL THAT APPLY - PROMPT AS NECESSARY) plus questions detailing which level of those qualifications (NVQ, GCSEs, degree etc.)	

Source: EU-LFS country questionnaires, Eurostat (2009)

Table C.4: Operationalisation of educational attainment in the ESS, EU-SILC and EU-LFS

	ESS last available round				EU-SILC 2006				EU-LFS 2005			
	Question	Response	Items	Cat's	Question	Response	Items	Cat's	Question	Response	Items	Cat's
AT	LA	I, C	1	6	C	I, C	1	11	LC	I, C	1	16
BE	LC	L, I	1	11	C	P, C	1	35	C	P, C	1	14
BG	C	L	1	6	.	.	.	.	LC	C, P	1	11
CH	LC	I, P, C	1	13	.	.	.	.	C	I, P, C	7+	many
CY	C	L, C	1	6	LC	I, C	1	9	n.i.			
CZ	L	L, C	1	11	n.i.				LC	L, C	1	12
DE	C	C, P	2	5; 14MR	C	C, P	2	6; 11	C	C	4	6; 11
DK	LR	L	1	9	R				R, LC	P, O	1	11+
EE	LA	P, C	2	19	LC	P, C	2	18	LC	P, C	2	19
ES	LA	O (P, C)	1	17	LA	O	1	.	LC	O	1	
FI	LC	I, C	1	6	R				LC, C, R	.	.	.
FR	LA	C, P	1	12	C	C	1	7	LR, C	P, C	7	n.i.
GR	C	L, C	1	8	LC	I, C	1	10	LC	O	1	
HU	L	I, C	1	14	L	I, C	1	11	n.i.			
IE	LA	C, L	1	7	LA	C	5	30	LA	C	5	29
IL	LA	C, P	1	14	.	.	.	.	.	.	.	.
IS	L	C, P	1	7	LC, C	C, L, P(O)	9	20+	LC, C	C, L	9	20+
IT	C	C	1	8	C	C	1	9	C	C, I	1	12
LT	.	.	.	.	L	P, C	1	13	C?	P, C	1	13
LU	LA	C, L	1	19	C	C, L	1	19	C	O	1	
LV	LA	L, C	1	11	LC	P	1	11	LC	P	1	13
NL	LC	P, I	1	13	n.i.				LR, C	P, C	9+	many
NO	L	L	1	9	R				R, LC	P, I	3	14

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TABLE C.4: Operationalisation of educational attainment in the ESS, EU-SILC and EU-LFS (*continued*)

	ESS last available round				EU-SILC 2006				EU-LFS 2005			
	Question	Response	Items	Cat's	Question	Response	Items	Cat's	Question	Response	Items	Cat's
PL	LC	L, C	1	9	LA	P, C	1	11	LC	n.i.		
PT	LC	L, C	1	10	LC	P, C	1	12	LC	L, C	1	11
RO	C	I	1	8	.	.	.	.	.	.	.	
RU	LR	L, C	1	13	.	.	.	.	.	.	.	.
SE	L	I, P, C	1	13	LC, C	I, P, C(O)	10	16+	R	R		
SI	LC	I, C	1	7	n.i.				L	P, C	1	10
SK	LA	I, P	1	9	LA	P, C	1	12	n.i.			
TR	L	C	1	10	.	.	.	.	C	I, C	1	11
UA	LR	L, C	1	7	.	.	.	.	.	.	.	
UK	C	C	2	5; 3	C	C	17	60+	C	C, C(O)	29	60+

Source: Country questionnaires from the ESS (available from NSD), EU-LFS (Eurostat, 2009) and EU-SILC (provided by Eurostat with the EU-SILC data).
Column explanations: 'Question': operationalisation of 'educational attainment' used. 'Response': concept(s) covered by the response categories. 'Items': Number of questionnaire items (excluding field of education and year of attainment). 'Cat's': Number of response categories. Unspecified categories ('other', 'don't know') are not counted.
Cell entries:
Dot: country was not included in the respective survey.
n.i.: questionnaire item/response categories not identified
MR: Multiple response item with the given number of response options
C: question refers to certificates (diplomas, degrees, qualifications); response categories largely consist of a certificates (diplomas, degrees, qualifications)
LA: question refers to (level of) education/programme achieved (obtained, attained)
LC: question refers to (level of) education/programme completed (terminated, finished)
LR: question refers to (level of) education/programme received (attended, taken)
L: question refers to education in a generic way; response categories are generic levels (primary, basic, secondary, tertiary)
I: Educational institutions mentioned (schools, colleges, universities)
P: educational programmes mentioned (vocational, general, professional, technical)
O: no response categories, but open question that is later post-coded. What follows in brackets are the types of categories that interviewers code the response into. If '(O)' preceded by another code, the open question is restricted to that type of information.

D

COUNTRY-SPECIFIC EDUCATION CATEGORIES AND THEIR MAPPING TO CROSS-NATIONAL SCHEMES IN THE ESS

D.1 COUNTRY-SPECIFIC EDUCATION VARIABLES AND DISTRIBUTIONS IN THE ESS

TABLE D.1: Country-specific education variables in the ESS

Highest level of education, AT (round one)		Freq.	%
1	keine Qualifikation (no qualification)	19	1.2
2	Pflichtschule (compulsory school)	420	25.7
3	Abschluss einer weiterbildenden Schule (intermediate school)	605	37.1
4	Matura (high school graduates)	353	21.6
5	akademischer Grad, Fachhochschulabschluss oder äquivalent (academic degree: university degree or equivalent)	233	14.2
6	Other	3	0.2
8	No answer	0	0.0
N		1633	100.0

Highest level of education, AT (rounds two and three)		Freq.	%
0	Pflichtschule nicht abgeschlossen (no qualification)	26	0.9
1	Pflichtschule (compulsory school)	445	14.5
2	Abschluss einer weiterbildenden Schule (BMS, Berufslehre, Berufsschule) (intermediate school)	1481	48.1
3	Höhere Schule mit Matura (AHS, BHS) (high school graduates)	585	19.0
4	Ausbildung nach Abschluss einer Höheren Schule, Bakkalaureat, hochschulverwandte Lehranstalt (berufsbildende, pädagogische Akademie), Kolleg	250	8.1
5	akademischer Grad, (Fach-) Hochschulabschluss oder äquivalent (academic degree: university degree or equivalent)	293	9.5
N		3081	100.0

Continued on the next page

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, BE		Freq.	%
0	Aucun terminé/Niet voltooid lager onderwijs (Not completed primary education)	30	0.9
1	Primaires/Lager onderwijs (Primary, basic, and special primary education)	274	7.8
2	Secondaire inférieur professionnel ou technique/Lager beroepsonderwijs (lower secondary voc. education)	384	11.0
3	Secondaire inférieur général/Lager algemeen secundair onderwijs (lower secondary gen. education)	238	6.8
4	Secondaire supérieur professionnel (A3)/Hoger secundair onderwijs (higher secondary voc. education)	423	12.1
5	Secondaire supérieur technique (A2)/Hoger secundair technisch, zevend beroepsopleiding (higher secondary technical, or 7th year voc. education)	532	15.2
6	Secondaire supérieur général/hoger algemeen secundair (higher secondary gen. education)	398	11.4
7	Supérieur de type court (A1)/hoger onderwijs korte type (higher education, short type)	645	18.4
8	Supérieur de type long/hoger onderwijs van het lange type (higher education, long type)	174	5.0
9	Universitaire/universiteit (university education)	353	10.1
10	Doctorat ou post-doctorat/doctoraal en postdoctoraal (doctoral and postdoctoral education)	37	1.1
11	Other	4	0.1
88	Don't know	2	0.1
99	No answer	4	0.1
N		3498	100.0

Highest level of education, BG		Freq.	%
1	По-ниско от начално образование (Not completed primary education)	14	1.6
2	Начално (Primary education, I–IV grade)	24	2.7
3	Основно (Lower secondary education, V–VIII grade)	189	21.0
4	Средно (Upper secondary, IX–XIII grade)	452	50.3
5	Полувисше (Post secondary, non-tertiary education)	56	6.3
6	Висше (Tertiary education)	161	17.9
88	Don't know	3	0.3
N		900	100.0

Continued on the next page

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, CH (rounds one and two)		Freq.	%
1	Keine abgeschlossene obligatorische Ausbildung/Ecole obligatoire inachevée/Scuola dell'obbligo non terminata (Incomplete compulsory school)	34	1.1
2	Obligatorische Schule (Sekundarschule)/Ecole obligatoire (école secondaire)/Scuola dell'obbligo (scuola media) (Compulsory school)	276	9.2
3	Anlehre (in Betrieb und Schule)/Formation prof. élémentaire (entreprise+école)/Formazione empirica (azienda+scuola) (Elementary voc. training, enterprise + school)	86	2.9
4	Maturitätsschulen, Gymnasium, Lehrerseminar, Schule für Unterrichtsberufe/Gymnase/collège, baccalauréat, école normale/études pédagogiques/Liceo (maturità), liceo, magistrali, scuola per professioni didattiche (Secondary school, Maturity)	223	7.5
5	Berufsmaturität/Maturité prof./Maturità prof. (Graduation diploma school, prof. Maturity)	26	0.9
6	1 Jahr Handelsschule/allgemeine Schule, Haushaltslehrjahr, Sprachaufenthalt/1 an : Ecole commerciale/de formation générale/stage ménager, séjour linguistique/1 anno: scuole commerciali o di formazione gen.e, ragazza alla pari, sogg. Linguistico (1 year: school of commerce/domestic science school)	70	2.3
7	Berufslehren, BMS, KV/Apprentissage (niveau CFC)/Apprendistato (livello CFC) (Apprenticeship)	1167	39.1
8	2–3 Jahre: allgemeinbildende Schule, (Diplommittelschule, Verkehrsschule)/2 à 3 ans : Ecole de formation générale (EDD=école de degré diplôme, école d'adm.)/2 a 3 anni: scuole di formazione gen.e (proped., ammin.) (2 to 3 years: gen. training school)	39	1.3
9	2–3 Jahre: Vollzeitberufsschule (Handelsschule, Lehrwerkstätte)/2 à 3 ans : Ecole prof./métiers à plein temps (éc. sup. de commerce, ateliers profess.)/2 a 3 anni: Scuola prof.e a tempo pieno (scuola superiore di commercio, ateliers prof.) (2 to 3 years: full time voc. school)	115	3.8
10	Höhere Berufsausbildung mit Meisterdiplom, Eidgenössischer Fachausweis/Formation prof. supérieure avec maîtrise, brevet fédéral/Formazione prof.e superiore con maestria, diploma/brevetto federale (voc. higher education with special degree)	302	10.1
11	Techniker-/Fachschule (2 Jahre Voll-/3 Jahre Teilzeit)/Ecole technique/prof. (2 ans plein temps/3 ans temps partiel)/Scuola tecnica/prof.e (2 anni a tempo pieno/3 anni a tempo parz.) (Technical or voc. school, 2 yrs full/ 3 yrs part time)	88	3.0
12	Höhere Fachschule, HTL, HMV, (3 Jahre Voll- oder 4 Jahre Teilzeit)/Ecole prof. sup./technicum/ingénieur ETS, haute école spécialisée (3 ans plein temps/4 ans temps partiel)/Scuola prof.e superiore, tecnicum, STS, scuola universitaria prof. (3 anni a tempo pieno/4 anni a tempo parziale) (Technical or voc. high school, specialized)	201	6.7
13	Universität (3 Jahre)/Université (3 ans, licence courte)/Università (3 anni) (University, 3 years, short bachelor's degree)	42	1.4

Continued on the next page

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, CH (rounds one and two)		Freq.	%
14	Universität, Hochschule (4 Jahre und mehr, Lizentiat)/Université, haute école (4 ans et plus, licence, diplôme)/Università, politecnico (4 anni e più, licenza.) (University, 4 years and more, bachelor's degree)	201	6.7
15	Universität, Hochschule (Dissertation, Nachdiplom)/Université, haute école (doctorat, post-grade)/Università, politecnico (licenza., dottorato, corsi post universitari) (University, masters, post-graduate degree)	92	3.1
16	Other	21	0.7
N		2983	100.0

Highest level of education, CH (round three)		Freq.	%
1	Nicht abgeschlossene Primarschule/Ecole primaire inachevée/Scuola elementare non terminata (Incomplete primary school)	12	1.0
2	Primarschule/Ecole primaire/Scuola elementare (Primary school)	45	3.6
3	Sekundar-, Real- und Oberschule/Cycle d'orientation, école secondaire/Scuola secondaria, scuola media (Secondary education, first stage)	82	6.6
4	Berufliche Grundbildung ((Eidg. Berufsattest) Anlehre in Betrieb und Schule, Handelsschule (1 Jahr), Allgemeinbildende Schule, 1–2 Jahre)/Formation prof. initiale (Attestation fédérale de formation prof.) Apprentissage court (2 ans), Ecole commerciale (1 an), Ecole de formation générale (1–2 ans)/Formazione prof.e di base (Certificato federale di formazione pratica) Apprendistato corto (2 anni), Scuole commerciali (1 anno), Scuole di formazione gen.e (1–2 anni) (Initial voc. training, 1–2years)	86	6.9
5	Berufslehre (Eidg. Fähigkeitszeugnis) Lehrbetriebe, Berufsfachschulen/Apprentissage (CFC) Ecoles prof.s, Entreprises formatrices/Apprendistato (AFC) Aziende di tirocinio, Scuole prof.i di base (Apprenticeship, voc. training, dual system)	482	38.6
6	Fachmittelschulen (FMS) (Fachmaturität, Fachmittelschulausweis) Diplommittelschulen (DMS), Handelsschule (3 Jahre)/Ecoles de culture générale (ECG) (Maturité spécialisée, certificat d'ECG) Ecoles de degré diplôme (EDD), Ecole commerciale (3 ans)/Scuole specializzate per le professioni sanitarie e sociali (SSPSS) (Certificato e maturità specializzata) Scuole di diploma (SDD), Scuola commerciale (3 anni) (gen. training school, 3 years)	58	4.6

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, CH (round three, continued)		Freq.	%
7	Maturitätsschulen (Berufs- und gymnasiale Maturität), Gymnasium, Lehrerseminar, Schule für Unterrichtsberufe, Höhere Handelsschule)/Ecoles de maturité (Maturité prof. et gymnasiale) Gymnase, Collège, Ecole normale, Etudes pédagogiques, Ecole supérieure de commerce/Scuole di maturità (Maturita prof.e e ginnasiale) Liceo, liceo magistrale, Scuola per professioni didattiche, Scuola superiore di commercio (School preparing for university, voc. baccalaureate)	71	5.7
8	Berufsbildung (Zweitausbildung)/Formation prof. (deuxième formation)/Formazione prof.e (seconda formazione) (voc. training, second)	46	3.7
9	Maturitätsschulen nach der Lehre und für Erwachsene (Berufsmaturität und Gymnasiale Maturität)/Ecoles pour maturité après apprentissage et pour adultes (Maturité prof. et gymnasiale)/Scuole di maturità dopo apprendistato e per adulti (Maturità prof.e e ginnasiale) (School for univ. for adults and baccal. after voc. training)	8	0.6
10	Höhere Berufsausbildung (Diplom, Eidg. Fachausweis) Höhere Fachschulen, Höhere Technische Lehranstalt (HTL)/Formation prof. supérieure (Diplôme, brevet fédéral) Ecoles supérieures spécialisées (ESS), Ecoles techniques supérieures (ETS)/Formazione prof.e superiore (Diploma, brevetto federale) Scuole superiori specializzate (SSS), Scuole tecniche superiori (STS) (Higher voc. training)	126	10.1
11	Fachhochschulen (FH), Pädagogische Hochschulen (PH) (Master, Bachelor, Diplom, Nachdiplom)/Hautes écoles spécialisées (HES), Hautes écoles pédagogiques (HEP) (Master, bachelor, diplôme, postgrade)/Scuole specializzate superiori (SSS), Alte scuole pedagogiche (ASP) (Master, Bachelor, diploma, post-grado) (Pedagogical and applied university)	88	7.0
12	Universitäre Hochschulen, Eidgenössische Technische Hochschulen (ETH) (Master, Bachelor, Lizentiat, Diplom, Nachdiplom)/Hautes écoles universitaires, Ecoles polytechniques fédérales (EPF) (Master, bachelor, licence, diplôme, postgrade)/Università cantonali e politecnici federali (PF) (Master, bachelor, licenza, diploma, post-grado) (University diploma and post-graduate, including technical)	122	9.8
13	Doktorat, PhD/Doctorat, PhD/Dottorato, PhD (University doctorate)	23	1.8
88	Don't know	1	0.0
N		1250	100.0

Continued on the next page

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, CY		Freq.	%
1	Μη προσοντούχος, χωρίς ιδιαίτερη μόρφωση (Not completed primary education)	4	0.5
2	Απολυτήριο Δημοτικού (Primary or first stage of basic)	71	10.4
3	Απολυτήριο Γυμνασίου (Lower secondary or second stage of basic)	76	11.1
4	Απολυτήριο Λυκείου (Upper secondary)	347	50.7
5	Δίπλωμα (Τριτοβάθμια μη Πανεπιστημιακή) (Diploma, Tertiary not university)	76	11.2
6	Πτυχίο, Μεταπτυχιακό, Διδακτορικό (Πανεπιστήμιο) (Bachelor/Master/PhD)	110	16.1
N		684	100.0

Highest level of education, CZ		Freq.	%
0	Nedokončené základní vzdělání (Uncompleted primary)	10	0.3
1	Základní vzdělání (Primary)	245	8.6
2	Vyučení bez maturity (voc., no upper diploma)	865	30.3
3	Střední vzdělání bez maturity (Secondary, no upper diploma)	301	10.5
4	Vyučení s maturitou (voc., diploma)	168	5.9
5	Úplné střední odborné vzdělání s maturitou (Secondary technical, diploma)	642	22.5
6	Střední všeobecné vzdělání s maturitou (Secondary academic, diploma)	235	8.2
7	Vyšší vzdělání (pomaturitní studium, vyšší škola, 5 a 6. roč. konzervatoře) (Higher)	80	2.8
8	Vysokoškolské bakalářské vzdělání (Tertiary, Bc.)	49	1.7
9	Vysokoškolské magisterské vzdělání (Tertiary, M.A.)	225	7.9
10	Vědecká výchova, postgraduální vzdělání (Post-graduate)	18	0.6
11	Other	9	0.3
77	Refusal	3	0.1
88	Don't know	9	0.3
99	No answer	2	0.1
N		2858	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of school education, DE[137]		Freq.	%
2	Schule beendet ohne Abschluss (No school leaving qualification)	108	1.9
3	Volks-/Hauptschulabschluss bzw. Polytechnische Oberschule mit Abschluss 8. oder 9. Klasse (Secondary gen. school leaving cert.)	1698	29.6
4	Mittlere Reife/Realschulabschluss bzw. Polytechnische Oberschule mit Abschluss 10. Klasse (Intermediate school leaving cert.)	2084	36.3
5	Fachhochschulreife (Abschluss einer Fachoberschule etc.) (Higher educ. entrance qual., but not for university)	426	7.4
6	Abitur bzw. Erweiterte Oberschule mit Abschluss 12. Kl. (Hochschulreife) (gen. higher education entrance qualification)	1382	24.1
7	Other	29	0.5
77	Refusal	15	0.3
N		5742	100.0

Highest level of post-school education, DE (rounds one and two)		Freq.	%
0	Keine berufliche Ausbildung (no voc./prof. education)	279	7.3
1	Beruflich-betriebliche Anlernzeit mit Abschlusszeugnis, aber keine Lehre (training time with certificate, but no apprenticeship)	49	1.3
2	Teilfacharbeiterabschluss (semi-skilled workers' certificate)	45	1.2
3	Abgeschlossene gewerbliche oder landwirtschaftliche Lehre (completed industrial or agricultural apprenticeship)	938	24.4
4	Abgeschlossene kaufmännische Lehre (completed commercial apprenticeship)	781	20.4
5	Berufliches Praktikum, Volontariat (internship, traineeship)	26	0.7
6	Fachschulabschluss (certificate from higher voc. school)	299	7.8
7	Berufsfachschulabschl., Berufsgrundbildungsjahr abgeschl. (voc. school certificate, basic voc. training year)	219	5.7
8	Meister-, Techniker- oder gleichwertiger Fachschulabschluss (Master craftsman, technician or equivalent certificate)	281	7.3
9	Abgeschlossenes Studium an Fachhochschule (auch Abschluss einer Ingenieurschule), Schule des Gesundheitswesens (completed studies at technical/voc. college, health sector school)	236	6.1
10	Hochschule/Universität: Zwischenprüfung/Vordiplom, Bachelor (Higher education: intermediate examination/diploma, Bachelor)	147	3.8
11	Abgeschlossenes Studium an Hochschule, Universität, Akademie, Polytechnikum (Diplom, Magister, Master, Staatsexamen) (completed studies in higher education, long university degree)	439	11.4
12	Promotion; Habilitation (PhD)	43	1.1
13	Other	46	1.2
77	Refusal	7	0.2
99	No answer	1	0.0
N		3960	100.0

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137 The data collection instrument for DE consists of two questionnaire items, one covering school leaving certificates, and the other covering post-school qualifications. These were obtained from the country-specific ESS files from NSD, since they are not included in the integrated file.

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of post-school education, DE (round three)		Freq.	%
0	Keine berufliche Ausbildung (no voc./prof. education)	127	6.7
1	Beruflich-betriebliche Anlernzeit mit Abschlusszeugnis, aber keine Lehre (training time with certificate, but no apprenticeship)	43	2.3
2	Teilfacharbeiterabschluss (semi-skilled workers' certificate)	12	0.6
3	Abgeschlossene gewerbliche oder landwirtschaftliche Lehre (completed industrial or agricultural apprenticeship)	527	27.7
4	Abgeschlossene kaufmännische Lehre (completed commercial apprenticeship)	415	21.8
5	Berufliches Praktikum, Volontariat 1 (internship, traineeship)	15	0.8
6	Fachschulabschluss (certificate from higher voc. school)	122	6.4
7	Berufsfachschulabschluss, Berufsgrundbildungsjahr abgeschlossen (voc. school certificate, basic voc. training year)	113	5.9
8	Meisterabschluss (Master craftsman)	77	4.0
9	Abgeschlossenes Studium an Fachhochschule (auch Abschluss einer Ingenieurschule), Schule des Gesundheitswesens (completed studies at technical/voc. college, health sector school)	135	7.1
10	Hochschule/Universität: Zwischenprüfung, Vordiplom (Higher education: intermediate examination/diploma)	64	3.4
11	Bachelor	2	0.1
12	Abgeschlossenes Studium an Hochschule, Universität, Akademie, Polytechnikum (Diplom, Magister, Master, Staatsexamen) (completed studies in higher education, long university degree)	190	10.0
13	Promotion; Habilitation	21	1.1
14	Other	33	1.7
77	Refusal	9	0.5
99	No answer	1	0.1
N		1905	100.0

Continued on the next page

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, DK (round one)		Freq.	%
0	Ingen skoleuddannelse, ingen erhvervsuddannelse (No school education, no voc. education)	1	0.1
1	1.–6. skoleklasse, ingen erhvervsuddannelse (1.-6. class in school, no voc. education)	3	0.3
2	7.–10. skoleklasse, ingen erhvervsuddannelse (7.-10. class in school, no voc. education)	166	15.8
3	Gymnasium, HF, HH, HTX, ingen erhvervsuddannelse (Upper secondary school, no voc. education)	58	5.5
4	Erhvervsfaglige uddannelser, håndværkeruddannelser, social og sundhedshjælperuddannelser (voc. education and training, apprenticeship training in crafts, social and health services)	458	43.5
5	Arbejdslederuddannelser for faglærte (Work leader education for voc. educated)	26	2.5
6	Videregående uddannelser på 2–3 år efter gymnasium eller faglig uddannelse (Further education of 2-3 years after upper secondary school)	117	11.1
7	Videregående uddannelser på ca. 4 år efter gymnasium eller faglig uddannelse (Further education of around 4 years after upper secondary school)	124	11.8
8	Bachelor eller kandidateksamen fra universitet (Bachelors or masters degree from university)	88	8.4
9	Overbygning på universitetseksamen, Ph.d., licentiat (Further university education i. e. PhD, Licentiate)	9	0.9
88	Don't know	2	0.2
N		1052	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, DK (rounds two and three)		Freq.	%
0	Ingen skoleuddannelse, ingen erhvervsuddannelse (No school education, no voc. education)	7	0.3
1	1.–6. skoleklasse, ingen erhvervsuddannelse (1.-6. class in school, no voc. education)	14	0.7
2	7.–10. skoleklasse, ingen erhvervsuddannelse (7.-10. class in school, no voc. education)	273	13.0
3	Gymnasium, HF, HH, HTX, ingen erhvervsuddannelse (Upper secondary school, no voc. education)	109	5.2
4	Erhvervsfaglige uddannelser, håndværkeruddannelser, social og sundhedshjælperuddannelser (voc. education and training, apprenticeship training in crafts, social and health services)	651	31.1
5	Korte videregående uddannelser (efter faglig uddannelse eller gymnasium) (har som oftest en varighed af 2–3 år, fx socialpædagog, maskintekniker, politi) (short further education of 2-3 years after upper secondary school, such as social pedagogue, mechanical technician, police)	305	14.6
6	Mellemlang videregående uddannelse (efter faglig uddannelse eller gymnasium), har som oftest en varighed af 3–4 år, fx teknikumingeniør, lærer, sygeplejerske (medium further education of 3–4 years after upper secondary school, such as engineer, teacher, nurse)	441	21.0
7	Lang videregående uddannelse (efter faglig uddannelse eller gymnasium) Universitetsuddannelser fx cand.jur., læge, cand.merc., arkitektskolerne, musikkonservatorierne) (long further education after upper secondary school, university studies such as architecture, medicine, music)	252	12.0
8	Overbygning på universitetseksamen, Ph.d., licentiat (Further university education i. e. PhD, Licentiate)	24	1.1
99	No answer	20	1.0
N		2096	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, EE (round two)[138]		Freq.	%
1	KIRJAOSKAMATU/НЕГРАМОТНЫЙ/АЯ (no primary education, illiterate)	0	0.0
2	Alghariduseta/Нет начального образования (no primary education, literate)	1	0.1
3	Algharidus/Начальное образование (primary education)	8	0.7
4	Põhiharidus (mittetäielik keskharidus)/Основное образование (неполное среднее образование) (gen. basic education, incomplete secondary education)	103	8.7
5	Keskharidus/Среднее образование (gen. secondary education)	224	18.8
6	Kutseharidus, õppeaeg alla 3 aasta; Kutseharidus, õppeaeg 3 aastat või rohkemПрофессиональное образование, обучение менее 3 лет; Профессиональное образование, обучение 3 года и более (voc. education without primary education)	0	0.0
7	Kutseharidus koos põhihariduse omandamisega/Профессиональное образование с получением основного образования (voc. basic education)	5	0.4
8	Kutseharidus koos keskhariduse omandamisega, Kutsekeskharidus põhihariduse baasil/Профессиональное образование с получением среднего образования, Профессиональное среднее образование на базе основного образования (voc. secondary education)	201	16.9
9	Kutsekeskharidus keskhariduse baasil/Профессиональное среднее образование на базе среднего образования (voc. secondary education after secondary education)	103	8.7
10	Keskeri-/tehnikumiharidus pärast põhiharidust/Среднее профессиональное образование/техникум после основного образования (prof. secondary/technical education after basic education)	126	10.6
11	Keskeri-/tehnikumiharidus pärast keskharidust/Среднее профессиональное образование/техникум после среднего образования (prof. secondary/technical education after secondary education)	151	12.7
12	Kutsekõrgharidus, Rakenduskõrgharidus (diplomiõpe), Bakalaureus (kõrgharidus)/Профессиональное высшее образование, Прикладное высшее образование (дипломное обучение), Степень бакалавра (высшее образование) (higher voc. education, prof. higher education/diploma study, Bachelor)	245	20.6
13	Magister/Степень магистра (master's degree)	20	1.7
14	Teaduste kandidaat, doktor/Кандидат, доктор наук (candidate of sciences, doctor's degree)	3	0.3
N		1190	100.0

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138 For EE, educational attainment is measured using the same two-item instrument in both ESS rounds. However, the variable delivered to NSD in round two aggregates some of the categories that were separate in the questionnaire. The original variables could not be obtained.

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, EE (round three)[139]		Freq.	%
0	Alghariduseta; KIRJAOSKAMATU/Нет начального образования; НЕГРАМОТНЫЙ/АЯ (no primary education, illiterate)	0	0.0
1	Algharidus/Начальное образование (primary education)	2	0.2
2	Põhiharidus (mittetäielik keskharidus)/Основное образование (неполное среднее образование) (gen. basic education, incomplete secondary education)	44	4.9
3	Keskharidus/Среднее образование (gen. secondary education)	170	18.9
4	Kutseharidus, õppeaeg alla 3 aasta, Kutseharidus, õppeaeg 3 aastat või rohkem/Профессиональное образование, обучение менее 3 лет , Профессиональное образование, обучение 3 года и более (voc. education without primary education)	39	4.3
5	Kutseharidus koos põhihariduse omandamisega / Профессиональное образование с получением основного образования (voc. basic education)	22	2.4
6	Kutseharidus koos keskhariduse omandamisega / Профессиональное образование с получением среднего образования (voc. education with secondary education)	72	8.0
7	Kutsekeskharidus põhihariduse baasil/Профессиональное среднее образование на базе основного образования (voc. secondary education after basic edcuation)	64	7.1
8	Kutsekeskharidus keskhariduse baasil/Профессиональное среднее образование на базе среднего образования (voc. secondary education after secondary education)	43	4.8
9	Keskeri/tehnikumiharidus pärast põhiharidust/Среднее профессиональное образование/техникум после основного образования (prof. secondary/technical education after basic education)	90	10.0
10	Keskeri/tehnikumiharidus pärast keskharidust/Среднее профессиональное образование/техникум после среднего образования (prof. secondary/technical education after secondary education)	118	13.1
11	Kutsekõrgharidus/Профессиональное высшее образование (higher voc. education)	32	3.6
12	Rakenduskõrgharidus (diplomiõpe)/Прикладное высшее образование (дипломное обучение) (prof. higher education/diploma study,)	44	4.9
13	Bakalaureus (kõrgharidus)/Степень бакалавра (высшее образование) (Bachelor)	121	13.4
14	Magister/Степень магистра (Master)	35	3.9
15	Teaduste kandidaat/doktor/Кандидат/доктор наук (candidate of sciences, doctor's degree)	5	0.6
N		901	100.0

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139 For EE, educational attainment is measured using the same two-item instrument in both ESS rounds. However, only one of the resulting variables was delivered to NSD in round three, which covered voc., prof. and higher education qualifications. The variable presented here additionally includes information on gen. school education, derived from the cross-national variable *edulvl*.

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, ES (round one)		Freq.	%
0	Sin estudios/analfabeto (No studies/illiterate)	31	3.0
1	Estudios primarios sin terminar (menos de 5 años de escuela o EGB (Not completed primary education)	82	7.8
2	Estudios primarios completos (incluido 5o E.G.B.) (Primary education)	190	18.0
3	EGB, ESO o equivalente (antiguo Bachillerato elemental, graduado escolar, certificado escolar.) (Degree of primary education)	224	21.3
4	FP1 y Enseñanza técnico-profesional o equiv. (voc. education, first cycle)	81	7.7
5	Bachillerato superior, BUP, o equivalente (Secondary education)	139	13.2
6	FP2 o equivalente (voc. education, second cycle)	88	8.3
7	Estudios superiores 2 o 3 años (en centros de estudio no reglados) (2 or 3 years higher education, not leading to a university degree)	6	0.6
8	Arquitecto e ingeniero técnico (Polytechnical studies, short cycle: technical architect or technical engineer, 3 years university degree)	64	6.1
9	Diplomado de otras escuelas universitarias o equivalente (Other short cycle university degree, 3 years)	23	2.1
10	Arquitecto o ingeniero superior (Polytechnical studies, long cycle: architect, engineer, 5 years)	12	1.2
11	Licenciado (Other long cycle university degree, 5 years or more)	91	8.7
12	Estudios postgrado o especialización (Postgraduate degree)	8	0.8
13	Doctorado (Doctoral degree)	8	0.8
77	Refusal	5	0.5
N		1052	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, ES (rounds two and three)		Freq.	%
0	Sin estudios/analfabeto (No schooling / illiterate)	140	6.0
1	Estudios primarios sin terminar (Not completed primary education)	118	5.1
2	Certificado de escolaridad (gen. Basic Education)	149	6.4
3	Hasta 5o de EGB (Five years of gen. Basic Education)	53	2.3
4	Antigua primaria completa (Former primary education, 5 years)	198	8.5
5	EGB o ESO (gen. Basic or Compulsory Secondary Education, Graduate)	356	15.4
6	Bachillerato elemental (Former lower secondary education)	112	4.8
7	FP1 y Enseñanza Técnico Profesional o equivalente (voc. training I)	119	5.1
8	Bachillerato superior, BUP o equivalente (Higher secondary education)	242	10.5
9	FP2 o equivalente (voc. training II)	228	9.8
10	Estudios superiores de 2 o 3 años (en centros de estudios no reglados) (Post-secondary, non tertiary)	28	1.2
11	Arquitecto e Ingeniero Técnico (University degree, 3 years technical)	26	1.1
12	Diplomado de otras escuelas universitarias o equivalente (University degree, 3 years)	191	8.2
13	Arquitecto o Ingeniero Superior (University degree, 5 years technical)	24	1.0
14	Licenciado (University degree, 5 years)	260	11.2
15	Estudios de postgrado o especialización (Postgraduate studies)	32	1.4
16	Doctorado (PhD.)	20	0.9
77	Refusal	22	0.9
88	Don't know	1	0.0
N		2319	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, FI (rounds one and two)[140]		Freq.	%
0	Vähemmän kuin peruskoulun ala-aste tai vastaava/Mindre än grundskolans lågstadium eller motsvarande (less than primary school or equivalent completed)	6	0.2
1	Peruskoulun ala-aste (1-6 luokat), kansakoulu/Grundskolans lågstadium (årskurserna 1–6), folkskola (completion of grades 1–6 of basic school or old primary school)	289	11.0
2	Peruskoulun yläaste (7–9/10 luokat), keskikoulu/Grundskolans högstadium (årskurserna 7–9/10), mellanskola (completion of grades 7–9 and the voluntary 10th grade of basic or middle school)	376	14.3
3	Lukio, ylioppilas- tai ammatillinen tutkinto/Gymnasium, student- eller yrkesexamen (matriculation examination, voc. qualifications attained in 2–3 years, further and specialist voc. qualifications)	1001	38.1
5	Opisto- tai korkeakoulututkinto/Examen på institutnivå eller högskoleexamen (voc. college education of 2–3 years, polytechnic degrees, university degrees)	905	34.5
6	Lisensiaatin tai tohtorin tutkinto/Licentiat- eller doktorsexamen (licentiate and doctorate)	42	1.6
8	Don't know	6	0.2
N		2625	100.0

Highest level of education, FI (round three)		Freq.	%
0	Vähemmän kuin peruskoulun ala-aste tai kansakoulu/Mindre än grundskolans lågstadium eller folkskola (less than primary school or folk school completed)	15	1.2
1	Peruskoulun ala-aste (1–6 luokat), kansakoulu/Grundskolans lågstadium (årskurserna 1–6), folkskola (completion of grades 1–6 of basic school or folk school)	111	9.1
2	Peruskoulun yläaste (7–9/10 luokat), keskikoulu/Grundskolans högstadium (årskurserna 7–9/10), mellanskola (completion of grades 7–9 and the voluntary 10th grade of basic or middle school)	129	10.6
3	Lukio, ylioppilas- tai ammatillinen tutkinto/Gymnasium, student- eller yrkesexamen (matriculation examination, voc. qualifications attained in 2–3 years, further and specialist voc. qualifications)	473	38.8
5	Opisto- tai korkeakoulututkinto/Examen på institutnivå eller högskoleexamen (voc. college education of 2–3 years, polytechnic degrees, university degrees)	465	38.1
6	Lisensiaatin tai tohtorin tutkinto/Licentiat- eller doktorsexamen (licentiate and doctorate)	25	2.1
8	Don't know	1	0.1
N		1219	100.0

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140 FI did not submit a CSEV to NSD. This variable is thus derived from the cross-national variable *edulvl*, which is however identical with the output of the instrument.

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, FR (rounds one and two)		Freq.	%
1	Sans diplôme (no qualification)	131	5.9
2	Non diplomés jusqu'à la fin 3ème, 2nde, 1ère filière générale (dropouts from general upper secondary education)	73	3.3
3	Non diplomés du CAP, BEP filière prof. (dropouts from vocational upper secondary education)	96	4.3
4	*Certificat d'études primaires* (CEP) (certificate of primary education)	167	7.5
5	CAP, examen de fin d'apprentissage artisanal (upper secondary vocational training, craft apprenticeship exam)	346	15.6
6	BEP, BP, *Brevet d'Enseignement Agricole*, (BEA), *Brevet d'études commerciales* (BEC), *Brevet d'Enseignement Industriel* (BEI), *Brevet d'Enseignement Social*, (BES) (upper secondary vocational education and training)	246	11.1
7	Brevet élémentaire, Brevet d'étude du premier cycle, brevet des collèges (lower secondary school certificate)	105	4.7
8	Baccalauréat général, Brevet supérieur (general university entrance qualification)	231	10.4
9	Brevet de technicien, baccalauréat de technicien, baccalauréat technologique, baccalauréat professionnel (certificates of general, technological and vocational upper secondary education)	143	6.5
10	DEUG, DUT, BTS, certificat d'aptitude Pédagogique (certificates awarded upon completion of two years of post-secondary education (general, technological, vocational))	274	12.4
11	Diplôme universitaire des deuxième et troisième cycles, Doctorat, CAPES, Agrégation, Diplôme de grandes écoles (university diplomas of the second and third cycles, PhD, teacher training, post-graduate certificates, diploma of a grande école)	399	18.0
88	Don't know	3	0.1
N		2214	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, FR (round three)		Freq.	%
1	Sans diplôme (no qualification)	96	6.8
2	Non diplomés jusqu'à la fin 3ème, 2nd, 1ere filière générale (dropouts from general upper secondary education)	50	3.5
3	Non diplomés du CAP, BEP filière prof. (dropouts from vocational upper secondary education)	42	3.0
4	CEP	83	5.9
5	CAP, examen de fin d'apprentissage artisanal (Upper secondary vocational training, craft apprenticeship exam)	213	15.1
6	BEP, BP, BEA, BEC, BEI, BES (upper secondary vocational education and training)	201	14.2
7	Brevet élémentaire, Brevet d'étude du premier cycle, brevet des collèges (lower secondary school certificate)	39	2.7
8	Baccalauréat général, Brevet supérieur (general university entrance qualification)	137	9.7
9	brevet de technicien, baccalauréat de technicien, baccalauréat technologique, baccalauréat professionnel (certificates of general, technological and vocational upper secondary education)	119	8.4
10	DEUG, DUT, BTS, certificat d'aptitude Pédagogique (certificates awarded upon completion of two years of post-secondary education (general, technological, vocational))	204	14.5
11	Diplôme universitaire du deuxième cycle, CAPES, Diplôme des grandes écoles (University diplomas of the second cycle, teacher training, diploma of a grande école)	140	9.9
12	Diplôme universitaire du troisième cycle (*Diplôme d'études approfondies* (DEA), *Diplôme d'études supérieures spécialisées* (DESS)), Agrégation, Doctorat (University diplomas of the third cycle (post-graduate certificates), PhD)	89	6.3
N		1412	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, GR (round one)		Freq.	%
1	Αναλφάβητος /η, μερικές τάξεις του Δημοτικού (Illiterate/not completed primary)	77	4.9
2	Δημοτικό (Primary)	411	26.3
3	Μερική μέση εκπαίδευση (δηλ. μερικές τάξεις εξαταξίου γυμνασίου, νυχτερινό γυμνάσιο, κατώτερη σχολή) (Partial secondary)	297	19.0
4	Πλήρης μέση εκπαίδευση (εξατάξιο γυμνάσιο, λύκειο, μέσες σχολές) (Full secondary)	497	31.8
5	Ανώτερη Σχολή (πτυχιούχος) (Post secondary/polytechnic)	74	4.7
6	Ανώτατη Σχολή (πτυχιούχος) (University degree)	164	10.5
7	Μεταπτυχιακό δίπλωμα (Post graduate degree)	36	2.3
88	(Δ.Γ.) (Don't know)	2	0.1
99	No answer	2	0.2
N		1560	100.0

Highest level of education, GR (round two)		Freq.	%
1	Αναλφάβητος /η, μερικές τάξεις του Δημοτικού (Illiterate/not completed primary)	41	2.8
2	Δημοτικό (Primary)	401	27.1
3	Μερική μέση εκπαίδευση (δηλ. μερικές τάξεις εξαταξίου γυμνασίου, νυχτερινό γυμνάσιο, κατώτερη σχολή) (Partial secondary)	255	17.2
4	Πλήρης μέση εκπαίδευση(εξατάξιο γυμνάσιο, λύκειο, μέσες σχολές) (Full secondary)	469	31.6
5	Ανώτερη Σχολή (πτυχιούχος) (Post secondary/polytechnic)	105	7.1
6	Ανώτατη Σχολή (πτυχιούχος) (University degree)	181	12.2
7	Μεταπτυχιακό δίπλωμα (Post graduate degree)	26	1.7
8	Διδακτορικός τίτλος (PhD)	0	0.0
88	(Δ.Γ.) Don't know	4	0.3
N		1481	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, HU (round one)		Freq.	%
1	Nem járt iskolába (Never attented school)	4	0.4
2	1–4 Osztály elemi/általános iskola vagy azzal egyenértékű (1–4 form in primary school)	10	0.9
3	5–7 Osztály általános iskola vagy azzal egyenértékű (5–7 form in primary school)	26	2.3
4	Befejezett általános iskola vagy azzal egyenértékű (Completed primary school)	225	19.9
5	Szakmunkásképző (Trade school)	340	30.1
6	Befejezetlen középiskola (Not completed secondary school)	30	2.7
7	Érettségi, befejezett középiskola vagy azzal egyenértékű (Completed secondary school)	282	25.0
8	Befejezetlen felsőfokú tanintézet (főiskola vagy egyetem) (Not completed university/college)	0	0.0
9	Főiskolai diploma (College)	101	9.0
10	Egyetemi diploma (University)	67	5.9
11	Posztgraduális végzettség (Postgraduate studies)	9	0.8
12	Felsőfokú végzettség, tudományos fokozattal (Degree/PhD)	5	0.4
88	Don't know	29	2.6
N		1128	100.0

Highest level of education, HU (rounds two and three)		Freq.	%
1	Nem járt iskolába (No formal schooling)	1	0.0
2	1–4 Osztály elemi/általános iskola vagy azzal egyenértékű (1–4 years of elementary)	9	0.4
3	5–7 Osztály általános iskola vagy azzal egyenértékű (5–7 years of elementary)	22	1.1
4	Befejezett általános iskola vagy azzal egyenértékű (8 years of elementary)	328	16.4
5	Szakmunkásképző, szakiskola (voc.)	536	26.8
6	Befejezetlen középiskola (Uncomplete secondary qualification)	56	2.8
7	Érettségi, befejezett középiskola vagy azzal egyenértékű (Gymnasium, matura)	427	21.4
8	Érettségire épülő felsőfokra nem akkreditált szakképzés, középfokú techikum (Sec. technical+matura)	134	6.7
9	Felsőfokra akkreditált szakképzés, felsőfokú technikum (Higher technical+matura)	51	2.6
10	Befejezetlen felsőfokú tanintézet (főiskola vagy egyetem) (Uncomplete higher qualification)	37	1.8
11	Főiskolai diploma (College degree completed)	223	11.1
12	Egyetemi diploma (University degree completed)	144	7.2
13	Posztgraduális végzettség (Postgraduate qualification)	10	0.5
14	Felsőfokú végzettség, tudományos fokozattal (Scientific degree)	17	0.8
77	Refusal	1	0.1
N		1997	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, IE		Freq.	%
1	None/Primary not completed (<8 eduyrs, first 2 are ISCED 0)	126	3.1
2	Primary or equivalent (8–10 eduyrs)	509	12.4
3	Intermediate/Junior/Group Certificate or equivalent	892	21.6
4	Leaving Certificate or equivalent	1028	25.0
5	Diploma/Certificate	815	19.8
6	Primary degree	392	9.5
7	Post graduate/higher degree	346	8.4
77	Don't know	6	0.2
99	No answer	8	0.2
N		4122	100.0

Highest level of education, IL		Freq.	%
1	Lowest formal qualification	97	6.3
2	Not finish voc. high school	71	4.5
3	Full voc high school without matriculation certificate	118	7.6
4	Full voc high school with matriculation certificate	89	5.7
5	Not finish gen. high school	69	4.5
6	Full gen. high school without matriculation certificate	96	6.2
7	Full gen. high school with matriculation certificate	105	6.8
8	Yeshiva high school without full matriculation certificate	7	0.4
9	Yeshiva high school with full matriculation certificate	19	1.2
10	Post secondary	225	14.5
11	Not finished University degree	115	7.4
12	University BA degree completed	313	20.1
13	University MA/PhD degree completed	210	13.5
77	Refusal	5	0.3
88	Don't know	0	0.0
99	No answer	3	0.2
N		1555	100.0

Continued on the next page

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, IS[141]		Freq.	%
0	Engu, barnaskólanám eða minna (Not completed primary education)	0	0.0
1	Grunnskólapróf/gagnfræðapróf (certificate after 10 years basic education)	7	2.1
2	Stutt starfsnám, ár eða minna (short voc. education, one year or less)	75	22.0
3	Lengra starfsnám, iðnnám (longer voc. education, more than 1 year)	32	9.4
4	Stúdentspróf (matriculation examination)	97	28.4
5	Háskólastig, fyrsta gráða, t.d. BA/BS/Bed (university education, first degree)	49	14.4
6	Háskólastig, framhaldsnám (university education, graduate study)	81	23.8
N		341	100.0

Highest level of education, IT (round one)		Freq.	%
1	Senza titolo (no qualification)	11	1.3
2	Licenza elementare (primary school certificate)	132	15.4
3	Licenza media/avviamento professionale (lower secondary school certificate/old vocational qualification)	304	35.5
4	Diploma scuola media superiore (upper secondary school certificate)	326	38.0
5	Diploma universitario (university diploma)	16	1.8
6	Laurea (university degree (4-6 years))	54	6.3
7	Specializzazione post-laurea (post-graduate specialisation)	14	1.6
88	Don't know	0	0.0
N		856	100.0

Highest level of education, IT (round two)		Freq.	%
1	Senza titolo (no qualification)	7	0.7
2	Licenza elementare (primary school certificate)	121	11.8
3	Licenza media/avviamento professionale (lower secondary school certificate/old vocational qualification)	332	32.4
4	Diploma scuola media superiore (upper secondary school certificate)	405	39.6
5	Specializzazione post-diploma (post-secondary specialisation)	10	0.9
6	Diploma universitario o Laurea triennale (university diploma or 3-year university degree)	26	2.5
7	Laurea specialistica (specialist university degree (5 years))	101	9.9
8	Specializzazione post-laurea (post-graduate specialisation)	20	1.9
9	Other	2	0.2
N		1024	100.0

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141 IS did not submit a CSEV to NSD. This variable is thus derived from the cross-national variable *edulvl*, which is however identical with the output of the instrument.

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, LU		Freq.	%
0	Pas de diplôme/qualifications (no qualifications)	36	1.7
1	Ecole primaire (primary school)	241	11.7
2	Primaire supérieur (higher primary)	114	5.5
3	Enseignement complémentaire (complementary education)	125	6.1
4	Certificat d'enseignement secondaire technique inférieur (certificate of lower secondary technical education)	99	4.8
5	Certificat d'apprentissage (apprenticeship certificate)	27	1.3
6	Certificat de Capacité Manuelle : CCM (certificate of manual capacity (practical vocational training))	30	1.5
7	Certificat d'Initiation Technique et Professionnelle : CITP (certificate of technical and vocational initiation (first stage of a two-stage apprenticeship))	39	1.9
8	Certificat d'Aptitude Technique et Professionnelle : CATP (certificate of technical and vocational competence (second stage of a two-stage apprenticeship))	374	18.1
9	Diplôme de technicien (jusque 13e dans le régime technicien) (upper secondary technician's diploma)	48	2.3
10	Bac technique (jusque 13e ou 14e du régime technique) (technical university entrance qualification)	65	3.1
11	Enseignement secondaire général inférieur (general lower secondary education)	91	4.4
12	Diplôme de fin d'études secondaires (general upper secondary school leaving diploma)	199	9.6
13	Brevet de maîtrise artisanale (master craftsman's diploma)	71	3.4
14	Enseignement supérieur—BAC +2 (Higher education - 2 years)	102	4.9
15	Enseignement supérieur—BAC +3 (Higher education - 3 years)	123	5.9
16	Enseignement supérieur—BAC +4 (Higher education - 4 years)	105	5.1
17	Enseignement supérieur—BAC +5 ou plus (mais sans l'obtention d'un doctorat) (Higher education - 5 years or more, but no doctorate)	116	5.6
18	Enseignement supérieur – Doctorat (PhD)	18	0.8
19	Other	28	1.4
88	Don't know	11	0.6
99	No answer	4	0.2
N		2066	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, NL		Freq.	%
1	Niet voltooid lager onderwijs (Not completed primary school)	27	0.6
2	Lager onderwijs, basisschool, lager speciaal onderwijs (Primary school or first stage of basic education)	216	4.9
3	Lager beroepsonderwijs (LBO), lagere technische school, nijverheidsonderwijs, huishoudschool, VMBO basisberoepsgerichte of kaderberoepsgerichte leerweg (Lower secondary school, technical training)	757	17.2
4	MULO, ULO, MAVO, VMBO theoretische of gemengde leerweg (lower secondary school, theoretical training)	563	12.8
5	KMBO, VHBO (short upper secondary prof. education)	100	2.3
6	MBO beroepsopleidende leerweg (upper secondary prof. education)	885	20.1
7	MBO-plus voor toegang tot het HBO, korte HBO-opleiding (korter dan 2 jaar) (post secondary, non-tertiary education)	326	7.4
8	MMS, HAVO (Higher secondary school)	201	4.6
9	HBS, VWO, gymnasium, atheneum (pre-scientific secondary school)	144	3.3
10	Hoger beroepsonderwijs, kweekschool, conservatorium, MO-akten, nieuwe stijl hoge scholen (tertiary prof. education, HBO)	786	17.9
11	Wetenschappelijk onderwijs, universiteit, technische/economische hogeschool oude stijl (tertiary scientific education, university)	322	7.3
12	Postdoctorale opleiding (leraren- en beroepsopleidingen zoals medici, apotheker) (tertiary post-scientific education, such as teachers, doctors)	52	1.2
13	Aio/Oio of andere promotie-opleiding tot graad van doctor (second stage of tertiary education, PhD)	18	0.4
14	Other	1	0.0
88	Don't know	1	0.0
N		4399	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, NO		Freq.	%
0	Ingen utdanning (No education)	7	0.2
1	Barneskole/Folkeskole (Primary education, 1st.–7th. class level)	1	0.0
2	Ungdomskole/framhaldskole/grunnskole, Ettårig og toårig utdanning etter folkeskole (Lower secondary education)	477	12.0
3	Videregående grunnutdanning/Realskole,Grunnkurs og VKI videregående utdanning (Upper secondary, basic, 11th.–12th. class level)	772	19.5
4	Videregående avsluttende utdanning, VK II og VK III, gammel gymnasutdanning (Upper secondary, final year, 13th. class level+)	821	20.7
5	Påbygging til videregående utdanning, Teknisk fagskole (Post-secondary non-tertiary education, 14th. class level+)	290	7.3
6	Universitet/høyskole, 4 år eller mindre med eksamen, Lærerskole, sykepleieskole, Cand mag, Ingeniør (Tertiary education, short (higher education 4 years or short)	1022	25.8
7	Universitet/Høyskole, mer enn 4 år med eksamen, Hovedfag, Mastergrad, Sivilingeniør, Siviløkonom (Tertiary education, long (higher education more than 4 years)	513	12.9
8	Forskernivå, Dr grad (Doctoral Degree)	35	0.9
77	Refusal	1	0.0
88	Don't know	4	0.1
99	No answer	24	0.6
N		3967	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, PL (round one)		Freq.	%
1	Nieukończone podstawowe (Not completed primary education)	9	0.7
2	Ukończone podstawowe (Primary completed)	224	17.0
3	Gimnazjalne (Lower secondary)	0	0.0
4	Zasadnicze zawodowe (także 2-letnia SPR) (Basic voc.)	421	32.0
5	Nieukończone średnie (Ukończone co najmniej 2 lata nauki) (Secondary not completed, but at least two years of study)	22	1.6
6	Średnie ogólnokształcące (Secondary comprehensive)	70	5.4
7	Średnie zawodowe (technikum, liceum zawodowe lub liceum techniczne) (Secondary voc.)	286	21.7
8	Pomaturalne, policealne (Post secondary)	69	5.2
9	Licencjackie, inżynierskie (First stage of tertiary)	33	2.5
10	Nieukończone wyższe magisterskie lub lekarskie (Tertiary not completed, but at least 2 years of study)	24	1.9
11	Ukończone wyższe magisterskie lub lekarskie (Ukończone co najmniej 2 lata nauki) (Tertiary completed)	153	11.6
88	Don't know	5	0.4
N		1315	100.0

Highest level of education, PL (rounds two and three)		Freq.	%
1	Nieukończone podstawowe (Not completed primary education)	8	0.4
2	Ukończone podstawowe (Primary completed)	343	15.5
3	Gimnazjalne (Lower secondary)	0	0.0
4	Zasadnicze zawodowe (także 2-letnia SPR) (Basic voc.)	767	34.7
5	Średnie ogólnokształcące (Secondary comprehensive)	136	6.2
6	Średnie zawodowe (technikum, liceum zawodowe, techniczne lub profilowane) (Secondary voc.)	514	23.3
7	Pomaturalne, policealne (Post secondary)	116	5.2
8	Licencjackie, inżynierskie (First stage of tertiary)	60	2.7
9	Wyższe magisterskie lub lekarskie (Tertiary completed)	256	11.6
10	Other, not classified	7	0.3
77	Refusal	2	0.1
N		2209	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, PT (rounds one and two)		Freq.	%
1	Nenhum (no education)	112	5.2
2	1º ciclo do básico (4ª classe) (first cycle of basic (4th grade))	753	34.8
3	2º ciclo do básico (5º e 6º anos/preparatório) (second cycle of basic (5th or 6th grade))	431	20.0
4	3º ciclo do básico (9º ano/5º ano dos liceus) (third cycle of basic (9 years/5 years of liceum))	307	14.2
5	Secundário (12º ano/7º ano dos liceus ou equivalente/Propedêutico/serviço cívico) (secondary (12 years/7 years of liceum or equivalent, propedeutics, civil service))	316	14.6
6	Superior politécnico (polytechnic higher education)	41	1.9
7	Superior universitário (higher education (university))	187	8.7
8	Mestrado/Doutoramento (Master, PhD)	14	0.7
N		2161	100.0

Highest level of education, PT (round three)		Freq.	%
1	Nenhum (no education)	47	3.4
2	1º ciclo do básico (4ª classe) (first cycle of basic (4th grade))	524	38.4
3	2º ciclo do básico (5º e 6º anos/preparatório) (second cycle of basic (5th or 6th grade))	203	14.9
4	3º ciclo do básico (9º ano/5º ano dos liceus) (third cycle of basic (9 years/5 years of liceum))	198	14.5
5	Secundário (12º ano/7º ano dos liceus ou equivalente/Propedêutico/serviço cívico) (secondary (12 years/7 years of liceum or equivalent, propedeutics, civil service))	220	16.1
6	Superior politécnico (polytechnic higher education)	22	1.6
7	Superior universitário (licenciatura) (higher education (university degree))	131	9.6
8	Pós-graduação (pelo menos 1 ano) (post-graduate (at least 1 year))	8	0.6
9	Mestrado (Research Master)	7	0.5
10	Doutoramento (PhD)	4	0.3
88	Don't know	1	0.1
N		1364	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, RU		Freq.	%
1	Начальное образование (7 классов средней школы или меньше) (Primary education)	13	0.9
2	Незаконченная средняя школа (Incomplete high school)	56	3.8
3	ПТУ, ФЗУ, ФЗО, лицей без среднего образования (prof. education without secondary education)	50	3.4
4	Законченная средняя школа (Completed secondary school)	250	17.0
5	ПТУ, лицей со средним образованием или техническое училище (обучение 2–3 года) (prof. education on secondary level)	182	12.3
6	Среднее специальное образование: техникум, училище, колледж (Special technical education)	520	35.3
7	Несколько курсов вуза, но без диплома (Several grades of college with no certificate)	42	2.8
8	Получил диплом бакалавра (Bachelor degree from college)	0	0.0
9	Получил диплом магистра (Master degree from college)	1	0.0
10	Законченное высшее образование по 5–6 летней системе (диплом специалиста) (Completed college by 5–6 grade system)	347	23.5
11	Постдипломное образование: аспирантура, докторантура, ординатура, адъюнктура—без научной степени (Post-college education without scientific degree)	7	0.5
12	Научная степень (кандидат, доктор наук) (Scientific degree)	7	0.5
N		1475	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, SE (rounds one and two)		Freq.	%
1	Ej avslutad folkskola/grundskola (Not finished elementary school)	16	0.6
2	Folkskola (Elementary school, old, 7 years)	167	6.3
3	Grundskola/Enhetsskola (Elementary school, 9 years: 6+3)	270	10.2
4	Realskola/Flickskola (Lower secondary and elementary school, old)	63	2.4
5	Fackskola (1963–1970) (voc. school 1963-1970)	74	2.8
6	2-årig gymnasielinje (2 year high school)	465	17.6
7	3- eller 4-årig gymnasielinje (före 1995) (3-4 year high school prior 1995)	434	16.4
8	Yrkesinriktat gymnasieprogram (efter 1992) (voc. high school after 1992)	107	4.0
9	Teoretiskt inriktat gymnasieprogram (efter 1992) (t exsamhällsvetar-programmet eller Naturvetarprogrammet) (Theoretical high school after 1992)	36	1.4
10	Universitet/Högskola utan examen (University, no exam)	247	9.3
11	Universitet/Högskola, kortare än 3 år, med examen (University, exam less than 3 years)	198	7.5
12	Universitet/Högskola, 3 år eller längre, med examen (University, exam more than 3 years)	562	21.3
99	No answer	4	0.2
N		2643	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, SE (round three)		Freq.	%
1	Ej avslutad folkskola/grundskola (Not finished elementary school)	10	0.8
2	Folkskola (Elementary school, old, 7 years)	51	4.0
3	Grundskola/Enhetsskola (Elementary school, 9 years: 6+3)	135	10.6
4	Realskola/Flickskola (Lower secondary and elementary school, old)	26	2.0
5	Fackskola (1963–1970) (voc. school 1963-1970)	31	2.4
6	2-årig gymnasielinje (2 year high school)	215	16.8
7	3- eller 4-årig gymnasielinje (före 1995) (3-4 year high school prior 1995)	193	15.1
8	Yrkesinriktat gymnasieprogram (efter 1992) (voc. high school after 1992)	55	4.3
9	Teoretiskt inriktat gymnasieprogram (efter 1992) (t exsamhällsvetar-programmet eller Naturvetarprogrammet) (Theoretical high school after 1992)	16	1.3
10	Universitet/Högskola utan examen (University, no exam)	108	8.5
11	Universitet/Högskola, kortare än 3 år, med examen (University, exam less than 3 years)	104	8.1
12	Universitet/Högskola, 3 år eller längre, med examen (University, exam more than 3 years)	306	24.0
13	Forskarutbildning (post-graduate education (licentiate, PhD))	26	2.0
88	Don't know	1	0.1
N		1277	100.0

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TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, SI[142]		Freq.	%
1	Nedokončana osnovna šola (incomplete primary school)	72	2.6
2	Dokončana osnovna šola (completed primary school)	480	17.1
3	2–3 Letna poklicna šola (2-3 year vocational school)	757	26.9
4	Splošna gimnazija, poklicna gimnazija, štiriletna strokovna šola (General high school, vocational high school, four-year vocational school)	880	31.3
5	2 Letna višja (strokovna) šola (2 year high (professional) school)	192	6.8
6	Visoka šola ali fakulteta (professional higher education or university)	398	14.1
7	Magisterij, doktorat (post-graduate Research Masters, Doctorate)	35	1.2
N		2814	100.0

Highest level of education, SK		Freq.	%
1	Neukončená povinná školská dochádzka (Still in primary education)	0	0.0
2	Neukončená základná škola (Uncompleted primary)	25	1.2
3	Základná škola (Primary)	207	9.6
4	Stredná škola bez maturity (Secondary, no upper diploma)	698	32.4
5	Stredná škola s maturitou (Secondary, upper diploma)	788	36.5
6	Nadstavbové štúdium (Higher)	75	3.5
7	Vysoká škola—bakalárske štúdium (Tertiary, BA)	57	2.6
8	Vysoká škola—magisterské štúdium (Tertiary, MA)	214	9.9
9	Postgraduálne štúdium—vedecká výchova (Post-graduate)	19	0.9
10	Other	48	2.2
88	Don't know	3	0.1
99	No answer	22	1.0
N		2156	100.0

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142 SI did not submit a CSEV to NSD. This distribution is thus derived from the cross-national variable *edulvl*, which is however identical with the output of the instrument.

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, TR[143]		Freq.	%
0	Okuma-yazma bilmiyor, Okuma-yazma biliyor ama okul bitirmemiş/diplomasız (Illiterate, no diploma)	255	20.5
1	İlkokul mezunu (5 yıl) (Primary school diploma, 5 yrs of schooling)	604	48.5
2	İlköğretim mezunu (8 yıl), Genel ortaokul mezunu, Mesleki ortaokul mezunu (Secondary diploma, 8 yrs of schooling, general or vocational)	106	8.5
3	Genel lise mezunu, Mesleki lise mezunu (Secondary diploma, 8 yrs of schooling, general or vocational)	189	15.2
5	Universite veya yüksekokul mezunu (university or college graduate)	88	7.1
6	Master ve ya doktora derecesi sahibi (Post-graduate degree; MA or doctorate holder)	2	0.2
N		1244	100.0

Highest level of education, UA		Freq.	%
0	Неповна початкова освіта (менше 4-х класів середньої школи)/Неполное начальное образование (менее 4-х классов средней школы) (Not completed primary education; less than 4 years of schooling)	3	0.1
1	Початкова освіта (4–7 класів середньої школи)/Начальное образование (4–7 классов средней школы) (Primary education, 4–7 years of schooling)	37	1.5
2	Неповна середня освіта (8–9 класів середньої школи)/Неполное среднее образование (8–9 классов средней школы) (Incomplete secondary education; 8–9 years of schooling)	142	5.8
3	Повна середня освіта (10–11 класів середньої школи)/Полное среднее образование (10–11 классов средней школы) (Completed secondary education; 10–11 years of secondary school)	743	30.7
4	Середня спеціальна освіта (технікум, вище за середню, але не вища)/Среднее специальное образование (техникум, выше среднего, но не высшее) (Secondary technical education; college, more than secondary, but not higher)	1036	42.8
5	Перша ступінь вищої освіти (бакалавр)/Первая стадия высшего образования (бакалавр) (First stage of higher education; bachelor)	54	2.2
6	Повна вища освіта (спеціаліст, магістр, аспірантура, вчений ступінь)/Полное высшее образование (специалист, магистр, аспирантура, ученая степень) (Completed higher education; specialist, master, post-graduate training, academic degree)	405	16.8
88	Don't know	1	0.0
N		2420	100.0

Continued on the next page

143 The questionnaire item actually has more categories, but TR did not submit the CSEV to NSD. The distribution is thus derived from the cross-national variable *edulvl*

TABLE D.1: Country-specific education variables in the ESS (*continued*)

Highest level of education, UK (rounds one and three)		Freq.	%
0	No qualification, left school before age 11	1	0.0
1	No qualification, left school at age 11 to 13	10	0.3
2	No qualification, left school after age 14	562	19.4
3	Section 1: GCSE, CSE, GCE O-level, School Certificate or Matriculation, Scottish SCE Ordinary Grade, Scottish Standard Grade, Scottish Leaving Certificate, SUPE Ordinary, Northern Ireland Junior Certificate, Apprenticeship completed, RSA/OCR Certificate or (First) Diploma City and Guilds Certificate part I or Craft/Intermediate/Ordinary/Part II, NVQ/SVQ Level 1 or 2, GNVQ/GSVQ Foundation or Intermediate Level or equivalent	702	24.2
4	Section 2: GCE A-level, S-level, A2-level, AS-level, Scottish Higher Grades, Scottish Higher-Still, Scottish SCE/SLC/SUPE at Higher Grade, Scottish Higher School Certificate, Certificate of Sixth Year Studies, Northern Ireland Senior Certificate, RSA/OCR Advance Diploma, City, Guilds Advanced/Final/Part III, BTEC/Edexcel/BEC/TEC General ordinary National Certificate or Diploma (ONC or OND) ,NVQ/SVQ Level 3, GNVQ/GSVQ Advanced Level, or equivalent	351	12.1
5	Section 3: RSA/OCR Higher Diploma, City, Guilds Full Technological/ Part IV, NVQ/SVQ Level 4 or 5, or equivalent	325	11.2
6	Section 4: University/CNAA Bachelor Degree, Masters Degree, Diploma or M.Phil., BTEC/Edexcel/BEC/TEC Higher National Certificate or Diploma (HNC or HND), Teaching qualification, Nursing qualification or equivalent	907	31.3
7	Section 5: Ph.D., D.Phil or equivalent	42	1.4
N		2900	100.0

Highest level of education, UK (round two)		Freq.	%
0	No qualification, left school before age 11	4	0.3
1	No qualification, left school at age 11 to 13	9	0.7
2	No qualification, left school after age 14	298	24.1
3	CSE grade 2–5/GCSE grades D-G or equivalent	132	10.7
4	CSE grade 1/O-level/GCSE grades A-C or equivalent	246	19.9
5	A-level, AS-level or equivalent	177	14.3
6	Degree/postgraduate qualification or equivalent	289	23.4
7	Other	79	6.4
88	Don't Know	1	0.1
99	No Answer	2	0.1
N		1235	100.0

Source: ESS 2002–2007, files from NSD. Respondents aged 25–64. Weighted using the design weight (*dweight*). The English category labels were either the value labels of the CSEV, or extracted from the ESS Documenatation Reports Jowell and the Central Co-ordinating Team (2003, 2005, 2008). They are not always adequate because they do not use the international terminology (e. g. countries might use 'primary education' when they actually mean 'basic education').

D.2 MAPPING OF ESS COUNTRY-SPECIFIC EDUCATION VARIABLES TO CROSS-NATIONAL EDUCATION VARIABLES

The following table shows how the cross-national education variables used in this study are mapped with the CSEVs of all ESS countries. Countries are sorted alphabetically. If an entire CSEV changed, the country indicator in the left-most column will indicate the relevant ESS round(s).

Next to the country indicator follow the values of the CSEVs. The next two columns give the detailed labels of the response categories, in all languages used in the questionnaires, as well as in English. Response categories were taken from the original ESS questionnaires available from NSD. English labels are either derived from the value labels in the actual data (also available at NSD), from the ESS Documentation Reports (Jowell and the Central Co-ordinating Team, 2003, 2005, 2008) or self-translated if otherwise no translation would have been available.

The remaining columns show detailed mapping information for the response categories:

- The columns headed *edulvl* show the actual bridging of the CSEV with the ISCED variable *edulvl* in the ESS (see Section 4.1.1) in the three ESS rounds ('r1', 'r2' and 'r3'). A dot ('.') indicates that the country either did not participate in the respective ESS round, or that this country-specific response category did not exist in that ESS round, e. g. because another CSEV was used or only this category changed over rounds.
- Column 'ISCED 97' shows how country-specific category is mapped to ISCED according to the ISCED mappings (see Section 2.2.4 Eurostat, 2005; OECD, 1999; UNESCO/OECD World Education Indicators Programme, 2000, mappings for IL and UA provided by UNESCO-UIS). If a category could not be linked to the mappings (e. g. outdated qualifications, drop-out categories), the estimated ISCED category appears in parentheses.
- Column 'ES-ISCED' contains the mapping to ES-ISCED as described in Section 6.3.
- Column 'CASMIN' indicates the respective CASMIN categories (see Section 2.2.3), if available.
- The last five columns are related to 'years of education'. Column 'map' indicates the theoretical cumulative *years of education* of an educational programme/qualification according to the UOE mappings. Column 'h-years' shows the chosen coding for the derived measure hypothetical years of education. The remaining three columns show the mode, median and mean *actual* full-time equivalent *years of education* respondents in the respective country-specific education category spent in education (variable 'eduyrs').

For DE, there are two tables. The data do not include the CSEV from which ISCED was derived for DE. Therefore, the first mapping shows how categories that can be constructed from the instrument (see Table D.1) are coded in *edulvl* in the three ESS rounds. The second mapping shows how the other cross-national variables are mapped to (differently constructed) country-specific categories.

TABLE D.2: Mapping of ESS CSEVs to cross-national education variables

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire response category	English value label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
AT (1)	1	keine Qualifikation	no qualification	-	-	-	0, 1	I	1a	8	7	6	7	7
	2	Pflichtschule (9 years)	compulsory school	-	-	-	2	II	1b	9	9	9	9	10
	3	Abschluss einer weiterbildenden Schule	intermediate school	-	-	-	3	IIIb	1c, 2a	11–12	12	12	12	12
	4	Matura	high school graduates	-	-	-	3, 4	IIIa	2c	12–13	13	12	13	14
	5	akademischer Grad, Fachhochschulabschluss oder äquivalent	academic degree: university degree or equivalent	-	-	-	5, 6	V1, V2	3a, 3b	16–17	18	18	18	18
AT (2)	0	Pflichtschule nicht abgeschlossen	no qualification	-	0	0	0, 1	I	1a	8	7	6	8	9
	1	Pflichtschule	compulsory school	-	1	1	2	II	1b	9	9	9	9	9
	2	Abschluss einer weiterbildenden Schule (BMS, Berufslehre, Berufsschule)	intermediate school	-	2	2	3	IIIb	1c, 2a	11–12	12	12	12	12
	3	Höhere Schule mit Matura (AHS, BHS)	high school graduates	-	3	3	3, 4	IIIa	2c	12–13	13	13	13	14
	4	Ausbildung nach Abschluss einer Höheren Schule, Bakkalaureat, hochschulverwandte Lehranstalt (berufsbildende, pädagogische Akademie), Kolleg		-	4	4	4, 5	IIIa, IV, V1	2c, 3a, 3b	14–15	15	15	15	15
	5	akademischer Grad, (Fach-) Hochschulabschluss oder äquivalent	academic degree: university degree or equivalent	-	6	5	5, 6	V2	3a, 3b	16–17	18	18	18	19

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
BE	0	Aucun terminé/Niet voltooid lager onderwijs	Not completed primary education	0	0	0	0	I	1a	-	7	8	6	6
	1	Primaires/Lager onderwijs	Primary, basic, and special primary education	1	1	1	1	I	1b	6	8	8	8	8
	2	Secondaire inférieur professionnel ou technique/Lager beroepsonderwijs	lower secondary voc. education	2	2	1	2Ap	II	1c	-	9	9	10	10
	3	Secondaire inférieur général/Lager algemeen secundair onderwijs	lower secondary gen. education	2	2	2	2Ag	II	2b	8	9	9	10	10
	4	Secondaire supérieur professionnel (A3)/Hoger secundair onderwijs	higher secondary voc. education	3	3	3	3Cv	IIIb	2a	12	12	12	12	12
	5	Secondaire supérieur technique (A2)/Hoger secundair technisch, zevend beroepsopleiding	higher secondary technical, or 7th year voc. education	3	3	4	3A, 4A, 4C	IIIa	2c voc	12–13	13	12	13	13
	6	Secondaire supérieur général/hoger algemeen secundair	higher secondary gen. education	3	3	4	3Ag	IIIa (IV)	2c gen	12	12	12	12	13
	7	Supérieur de type court (A1)/hoger onderwijs korte type	higher education, short type	5	5	5	5B	IV	3a	15	15	15	15	15
	8	Supérieur de type long/hoger onderwijs van het lange type	higher education, long type	6	6	5	5Am, 5Al	V1	3a	16–17	16	16	16	16
	9	Universitaire/universiteit	university education	6	6	5	5Al	V2	3b	16–19	17	17	17	17
	10	Doctorat ou post-doctorat/doctoraal en postdoctoraal	doctoral and postdoctoral education	6	6	6	6	V2	3b	-	18	17	18	18
BG	1	По-ниско от начално образование	Not completed primary education	-	-	0	0	I	1a		3	3	4	4
	2	Начално	Primary education (I-IV grade)	-	-	1	1	I	1a	4	4	4	4	5
	3	Основно	Lower secondary education (V-VIII grade)	-	-	2	2	II	1b, 1c	8	8	8	8	8
	4	Средно	Upper secondary (IX-XIII grade)	-	-	3	3	IIIb, IIIa	2c, 2a	12	12	11	11	12
	5	Полувисше	Post secondary, non-tertiary education	-	-	4	4	IV	3a	14–15	14	14	14	14
	6	Висше	Tertiary education	-	-	5	5, 6	V1, V2	3b	15–21	16	16	16	17

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
CH (1, 2)	1	Keine abgeschlossene obligatorische Ausbildung/Ecole obligatoire inachevée/Scuola dell'obbligo non terminata	Incomplete compulsory school	0	0	-	0,1	I	1a		7	9	8	7
	2	Obligatorische Schule (Sekundarschule)/Ecole obligatoire (école secondaire)/Scuola dell'obbligo (scuola media)	Compulsory school	2	2	-	2Ag	II	1b	9	9	9	9	9
	3	Anlehre (in Betrieb und Schule)/Formation professionnelle élémentaire (entreprise + école)/Formazione empirica (azienda + scuola)	Elementary vocational training (enterprise + school)	3	3	-	3Cv	II	1c	11	11	9	9	9
	4	Maturitätsschulen, Gymnasium, Lehrerseminar, Schule für Unterrichtsberufe/Gymnase/collège, baccalauréat, école normale/études pédagogiques/Liceo (maturità), liceo, magistrali, scuola per professioni didattiche	Secondary school (Maturity)	3	3	-	3Ag,4Ag	IIIa	2c gen	12.5	13	14	13	13
	5	Berufsmaturität/Maturité professionnelle/Maturità professionale	Graduation diploma school (Maturity professional)	3	3	-	3Ag,4Ag	IIIa	2c voc	12–13	13	9	12	12
	6	1 Jahr Handelsschule/allgemeine Schule, Haushaltslehrjahr, Sprachaufenthalt/1 an: Ecole commerciale/de formation générale/stage ménager, séjour linguistique/1 anno: scuole commerciali o di formazione generale, ragazza alla pari, sogg. Linguistico	1 year: school of commerce/domestic science school	3	3	-	3Cvs	II	1c	10	10	10	10	10
	7	Berufslehren, BMS, KV/Apprentissage (niveau CFC)/Apprendistato (livello CFC)	Apprenticeship	3	3	-	3Bv	IIIb	2a	11–13	12	9	9	9
	8	2–3 Jahre: allgemeinbildende Schule, (Diplommittelschule, Verkehrsschule)/2 à 3 ans: Ecole de formation générale (EDD=école de degré diplôme, école d'adm.)/2 a 3 anni: scuole di formazione generale (proped., ammin.)	2 to 3 years: general training school	3	3	-	3Cgl, 3Bg	IIIb	2b	12	12	10	12	12
	9	2–3 Jahre: Vollzeitberufsschule (Handelsschule, Lehrwerkstätte)/2 à 3 ans: Ecole professionnelle/métiers à plein temps (éc. sup. de commerce, ateliers profess.)/2 a 3 anni: Scuola professionale a tempo pieno (scuola superiore di commercio, ateliers prof.)	2 to 3 years: full time vocational school	3	3	-	3Cvl, 3Bv	IIIb	2a	12	12	12	12	11
	10	Höhere Berufsausbildung mit Meisterdiplom, Eidgenössischer Fachausweis/Formation professionnelle supérieure avec maîtrise, brevet fédéral/Formazione professionale superiore con maestria, diploma/brevetto federale	Vocational higher education (with special degree)	4	4	-	5B	IV	3a	13–16	14	9	10	11

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
	11	Techniker- oder Fachschule (2 Jahre Voll- oder 3 Jahre Teilzeit)/Ecole technique ou prof. (2 ans plein temps/3 ans temps partiel)/Scuola tecnica o professionale (2 anni a tempo pieno/3 anni a tempo parz.)	Technical or vocational school (2 yrs full/3 yrs part time)	4	4	-	5B	IV	3a	14	14	9	11	11
	12	Höhere Fachschule, HTL, HMV, (3 Jahre Voll- oder 4 Jahre Teilzeit)/Ecole prof. sup./technicum/ingénieur ETS, haute école spécialisée (3 ans plein temps/4 ans temps partiel)/Scuola professionale superiore, tecnicum, STS, scuola universitaria prof. (3 anni a tempo pieno/4 anni a tempo parziale)	Technical or vocational high school (specialized)	5	5	-	5B	IV	3a	14–17	15	9	13	13
	13	Universität (3 Jahre)/Université (3 ans, licence courte)/Università (3 anni)	University (3years, short bachelor's degree)	5	5	-	5Am	V1	3b	16	16	17	16	16
	14	Universität, Hochschule (4 Jahre und mehr, Lizentiat)/Université, haute école (4 ans et plus, licence, diplôme)/Università, politecnico (4 anni e più, licenza.)	University (4years and more, university degree)	5	5	-	5Am, 5Al	V2	3b	18	18	18	17	17
	15	Universität, Hochschule (Dissertation, Nachdiplom)/Université, haute école (doctorat, post-grade)/Università, politecnico (licenza, dottorato, corsi post universitari)	University (masters, post-grade) (should say: PhD, post-graduate studies)	6	6	-	5Al, 6	V2	3b	18–20	19	20	19	18

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
CH (3)	1	Nicht abgeschlossene Primarschule/Ecole primaire inachevée/Scuola elementare non terminata	Incomplete primary school	-	-	0	0	I	1a		7	8	8	8
	2	Primarschule/Ecole primaire/Scuola elementare	Primary school	-	-	1	1	I	1a	6	8	9	9	8
	3	Sekundar-, Real- und Oberschule/Cycle d'orientation, école secondaire/Scuola secondaria, scuola media	Secondary education, first stage	-	-	2	2Ag	II	1b	9	9	9	9	9
	4	Berufliche Grundbildung ((Eidg. Berufsattest) Anlehre in Betrieb und Schule, Handelsschule (1 Jahr), Allgemeinbildende Schule (1–2 Jahre))/Formation professionnelle initiale (Attestation fédérale de formation professionnelle) Apprentissage court (2 ans), Ecole commerciale (1 an), Ecole de formation générale (1–2 ans)/Formazione professionale di base (Certificato federale di formazione pratica) Apprendistato corto (2 anni), Scuole commerciali (1 anno), Scuole di formazione generale (1–2 anni)	Initial vocational training (1–2years)	-	-	3	3Cvs	II	1c	10–11	11	12	11	11
	5	Berufslehre (Eidg. Fähigkeitszeugnis) Lehrbetriebe, Berufsfachschulen/Apprentissage (CFC) Ecoles professionnelles, Entreprises formatrices/Apprendistato (AFC) Aziende di tirocinio, Scuole professionali di base	Apprenticeship (vocational training, dual system)	-	-	3	3Cvl, 3Bv	IIIb	2a	11–13	12	12	12	13
	6	Fachmittelschulen (FMS) (Fachmaturität, Fachmittelschulausweis) Diplommittelschulen (DMS), Handelsschule (3 Jahre)/Ecoles de culture générale (ECG) (Maturité spécialisée, certificat d'ECG) Ecoles de degré diplôme (EDD), Ecole commerciale (3 ans)/Scuole specializzate per le professioni sanitarie e sociali (SSPSS) (Certificato e maturità specializzata) Scuole di diploma (SDD), Scuola commerciale (3 anni)	General training school (3 years)	-	-	3	3Bg	IIIb	2b	12	12	12	14	14
	7	Maturitätsschulen (Berufs- und gymnasiale Maturität) Gymnasium, Lehrerseminar, Schule für Unterrichtsberufe, Höhere Handelsschule)/Ecoles de maturité (Maturité professionnelle et gymnasiale) Gymnase, Collège, Ecole normale, Etudes pédagogiques, Ecole supérieure de commerce/Scuole di maturità (Maturita professionale e ginnasiale) Liceo, liceo magistrale, Scuola per professioni didattiche, Scuola superiore di commercio	School preparing for university, vocational baccalaureate	-	-	3	3Ag	IIIa	2c voc, 2c gen	12–13	13	14	14	14

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
	8	Berufsbildung (Zweitausbildung)/Formation professionnelle (deuxième formation)/Formazione professionale (seconda formazione)	Vocational training (second)	-	-	4	4Bv	IV	2a	13–14	14	14	14	14
	9	Maturitätsschulen nach der Lehre und für Erwachsene (Berufsmaturität und Gymnasiale Maturität)/Ecoles pour maturité après apprentissage et pour adultes (Maturité professionnelle et gymnasiale)/Scuole di maturità dopo apprendistato e per adulti (Maturità professionale e ginnasiale)	School for univ. for adults and baccal. after voc. training	-	-	4	4Ag	IIIa	2c	15.5	15	16	15	15
	10	Höhere Berufsausbildung (Diplom, Eidg. Fachausweis) Höhere Fachschulen, Höhere Technische Lehranstalt (HTL)/Formation professionnelle supérieure (Diplôme, brevet fédéral) Ecoles supérieures spécialisées (ESS), Ecoles techniques supérieures (ETS)/Formazione professionale superiore (Diploma, brevetto federale) Scuole superiori specializzate (SSS), Scuole tecniche superiori (STS)	Higher vocational training	-	-	5	5B	IV	3a	13–17	15	15	16	16
	11	Fachhochschulen (FH), Pädagogische Hochschulen (PH) (Master, Bachelor, Diplom, Nachdiplom)/Hautes écoles spécialisées (HES), Hautes écoles pédagogiques (HEP) (Master, bachelor, diplôme, postgrade)/Scuole specializzate superiori (SSS), Alte scuole pedagogiche (ASP) (Master, Bachelor, diploma, post-grado)	Pedagogical and applied university	-	-	5	5Am, 5Al	V1, V2	3a	15–18	17	16	17	17
	12	Universitäre Hochschulen, Eidgenössische Technische Hochschulen (ETH) (Master, Bachelor, Lizentiat, Diplom, Nachdiplom)/Hautes écoles universitaires, Ecoles polytechniques fédérales (EPF) (Master, bachelor, licence, diplôme, postgrade)/Università cantonali e politecnici federali (PF) (Master, bachelor, licenza, diploma, post-grado)	University degree and post-graduate (including technical) qualifications	-	-	5	5Am, 5Al	V1, V2	3b	16–19	19	19	19	19
	13	Doktorat, PhD/Doctorat, PhD/Dottorato, PhD	University doctorate	-	-	6	6	V2	3b	20	20	18	20	21

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
CY	1	Μη προσοντούχος, χωρίς ιδιαίτερη μόρφωση	Not completed primary education	-	-	-	0	I	1a		0	0	0	1
	2	Απολυτήριο Δημοτικού	Primary or first stage of basic	-	-	-	1	I	1a	6	6	6	6	6
	3	Απολυτήριο Γυμνασίου	Lower secondary or second stage of basic	-	-	-	2	II	1b	9	9	9	9	9
	4	Απολυτήριο Λυκείου	Upper secondary	-	-	-	3	IIIa, IIIb	2c, 2a	12	12	12	12	12
	5	Δίπλωμα (Τριτοβάθμια μη Πανεπιστημιακή)	Diploma (Tertiary not university)	-	-	-	5	IV	3a	14–17	15	15	15	15
	6	Πτυχίο, Μεταπτυχιακό, Διδακτορικό (Πανεπιστήμιο)	Bachelor/Master/PhD	-	-	-	5, 6	V1, V2	3b	16–20	16	16	16	16
CZ	0	Nedokončené základní vzdělání	Uncompleted primary	0	0	0	0,1	I	1a		7	7	7	7
	1	Základní vzdělání	Primary (first stage 5 years, second stage 4 years)	2	2	2	2Ag	II	1b	9	9	9	9	9
	2	Vyučení bez maturity	Vocational, no upper diploma	3	3	3	3Cv	IIIb	2a	12	12	12	12	12
	3	Střední vzdělání bez maturity	Secondary, no upper diploma	3	3	3	3Cg	IIIb	2b		12	12	12	12
	4	Vyučení s maturitou	Vocational, diploma	3	3	3	3Av	IIIa	2c voc	13	13	13	13	13
	5	Úplné střední odborné vzdělání s maturitou	Secondary technical, diploma	3	3	3	3Av	IIIa	2c voc	13	13	13	13	13
	6	Střední všeobecné vzdělání s maturitou	Secondary academic, diploma	3	3	3	3Ag	IIIa	2c gen	13	13	13	13	13
	7	Vyšší vzdělání (pomaturitní studium, vyšší škola, 5 a 6. roč. konzervatoře)	Higher	4	4	4	5B	IV	3a	14–16	15	15	15	15
	8	Vysokoškolské bakalářské vzdělání	Tertiary, Bc.	5	5	5	5Am	V1	3b	16	17	17	17	17
	9	Vysokoškolské magisterské vzdělání	Tertiary, M.A.	5	5	5	5A;	V2	3b	18–19	18	18	18	18
	10	Vědecká výchova, postgraduální vzdělání	Post-graduate	6	6	6	5, 6	V2	3b	19–21	19	18	18	19

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
DE	1	Schule beendet ohne Abschluss, keine berufliche Ausbildung	Left school without school leaving qualification, no voc./prof. education	1	1	1	0, 1							
	2	Schule beendet ohne Abschluss, Anlernzeit	Left school without school leaving qualification, training time with certificate, but no apprenticeship	1	1	3	(2Cv)							
	3	Hauptschulabschluss, kein beruflicher Abschluss	Secondary gen. school leaving cert., no voc./prof. education	2	2	2	2Ag							
	4	Hauptschulabschluss, Anlernzeit	Secondary gen. school leaving cert., training time with certificate, but no apprenticeship	2	2	3	(2Cv)							
	5	Realschulabschluss, kein beruflicher Abschluss	Intermediate school leaving cert., no voc./prof. education	2	2	2	2Ag							
	6	Realschulabschluss, Anlernzeit	Intermediate school leaving cert. and training time with certificate, but no apprenticeship	3	2	3	(3Cs)							
	7	Fachhochschulreife, kein beruflicher Abschluss	Higher educ. entrance qual., but not for university, no voc./prof. education	3	3	3	3Ag							
	8	Abitur, kein beruflicher Abschluss	Gen. higher education entrance qualification, no voc./prof. education	3	3	3	3Ag							
	9	Schule beendet ohne Abschluss, Haupt- oder Realschulabschluss plus Teilfacharbeiterabschluss, berufliches Praktikum, Volontariat	Left school without school leaving qualification, secondary gen. school leaving cert. or intermediate school leaving cert. and semi-skilled workers' certificate, internship, traineeship	3	3	3	(2Cv)							
	10	Schule beendet ohne Abschluss, Haupt- oder Realschulabschluss plus Berufsfachschulabschluss, Berufsgrundschuljahr	Left school without school leaving qualification, secondary gen. school leaving cert. or intermediate school leaving cert. and voc. school certificate, basic voc. training year	3	3	5	3Bv							

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
	11	Schule beendet ohne Abschluss, Haupt- oder Realschulabschluss plus gewerbliche/landwirtschaftliche Ausbildung, kaufmännische Ausbildung	Left school without school leaving qualification, secondary gen. school leaving cert. or intermediate school leaving cert. and completed industrial or agricultural apprenticeship, completed commercial apprenticeship	3	3	3	3Bv							
	13	FH-Reife oder Abitur plus Anlernzeit, Teilfacharbeiterabschluss	Any higher educ. entrance qual. and training time with certificate, but no apprenticeship, semi-skilled workers' certificate	3	3	4	(3Ag)							
	14	FH-Reife oder Abitur plus berufliches Praktikum, Volontariat	Any higher educ. entrance qual. and internship, traineeship	4	4	4	(3Ag)							
	15	FH-Reife/Abitur plus Berufsfachschulabschluss, Berufsgrundschuljahr	Any higher educ. entrance qual. and voc. school certificate, basic voc. training year	4	4	5	4Av							
	16	FH-Reife oder Abitur plus gewerbliche/landwirtschaftliche Ausbildung, kaufmännische Ausbildung	Any higher educ. entrance qual. and completed industrial or agricultural apprenticeship, completed commercial apprenticeship	4	4	4	4Av							
	17	Fachschulabschluss	Certificate from higher voc. school	3	3	5	5B							
	18	Meister-, Techniker- oder gleichwertiger Fachschulabschluss	Master craftsman, technician or equivalent certificate	5	5	5	5B							
	19	Abgeschlossenes Studium an Fachhochschule/Ingenieurschule, Schule des Gesundheitswesens	Completed studies at technical/voc. college, health sector school	5	5	5	3Bv, 5B, 5Am							
DE (1, 2)	12	Schule beendet ohne Abschluss, Haupt- oder Realschulabschluss plus Hochschule/Universität: Zwischenprüfung, Vordiplom, Bachelor	Left school without school leaving qualification, secondary gen. school leaving cert. or intermediate school leaving cert. and Intermediate examination, intermediate diploma, Bachelor	3	3	-	5Ai, 5Am							
	20	FH-Reife oder Abitur plus Hochschule/Universität: Zwischenprüfung, Vordiplom, Bachelor	Any higher educ. entrance qual. and intermediate examination, intermediate diploma, Bachelor	3	3	-	5Ai, 5Am							

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

	ESS country-specific education categories			edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
	21	Abgeschlossenes Studium an Hochschule, Universität, Akademie, Polytechnikum (Diplom, Magister, Master, Staatsexamen)	University degree	5	5	5	5Al							
	22	Promotion; Habilitation	PhD	6	6	6	6							
DE (3)	12	Schule beendet ohne Abschluss, Haupt- oder Realschulabschluss plus Hochschule/Universität: Zwischenprüfung, Vordiplom	Left school without school leaving qualification, secondary gen. school leaving cert. or intermediate school leaving cert. and Intermediate examination, intermediate diploma	-	-	3	5Ai							
	20	FH-Reife oder Abitur plus Hochschule/Universität: Zwischenprüfung, Vordiplom	Any higher educ. entrance qual. and intermediate examination, intermediate diploma	-	-	4	5Ai							
	21	Bachelor	Bachelor	-	-	5	5Am							
	22	Abgeschlossenes Studium an Hochschule, Universität, Akademie, Polytechnikum (Diplom, Magister, Master, Staatsexamen)	University degree	5	5	5	5Al							
	23	Promotion; Habilitation	PhD and habilitation	6	6	6	6							

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
DE	2	Schule beendet ohne Abschluss, keine berufliche Ausbildung	Left school without school leaving qualification, no voc./prof. education				1	I	1a		8	8	8	8
	3	Hauptschulabschluss, kein beruflicher Abschluss	Secondary gen. school leaving cert., no voc./prof. education				2Ag	II	1b	10	9	8	9	9
	4	Realschulabschluss, kein beruflicher Abschluss	Intermediate school leaving cert., no voc./prof. education				2Ag	II	2b	10	10	10	12	12
	5	Schule beendet ohne Abschluss oder Hauptschulabschluss und Anlernzeit, Teilfacharbeiterabschluss	Left school without school leaving qualification or secondary gen. school leaving cert. and training time with certificate, but no apprenticeship, semi-skilled workers' certificate				(2Cv)	II	1c		10	9	10	10
	6	Realschulabschluss und Anlernzeit, Teilfacharbeiterabschluss	Intermediate school leaving cert. and training time with certificate, but no apprenticeship, semi-skilled workers' certificate				(3Cs)	II	2a		11	11	12	12
	7	Schule beendet ohne Abschluss oder Hauptschulabschluss plus Berufsfachschulabschluss, Berufsgrundschuljahr, Ausbildung	Left school without school leaving qualification or secondary gen. school leaving cert. and voc. school certificate, basic voc. training year, apprenticeship				3Bv, 4Bv	IIIb (IV)	1c	11–13	12	12	12	11
	8	Realschulabschluss plus Berufsfachschulabschluss, Berufsgrundschuljahr, Ausbildung	Intermediate school leaving cert. and voc. school certificate, basic voc. training year, apprenticeship				3Bv, 4Bv	IIIb (IV)	2a	11–13	13	13	13	13
	9	Fachhochschulreife, kein beruflicher Abschluss oder Anlernzeit, Teilfacharbeiterabschluss, berufliches Praktikum, Volontariat	Higher educ. entrance qual., but not for university and no voc./prof. education, or training time with certificate, but no apprenticeship, semi-skilled workers' certificate, internship, traineeship				3Ag	IIIa	2c gen	12	12	13	13	14

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

		ESS country-specific education categories		edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
	10	Abitur, kein beruflicher Abschluss oder Anlernzeit, Teilfacharbeiterabschluss, berufliches Praktikum, Volontariat	Gen. higher education entrance qualification and no voc./prof. education or training time with certificate, but no apprenticeship, semi-skilled workers' certificate, internship, traineeship				3Ag	IIIa	2c gen	13	13	16	16	15
	11	FH-Reife oder Abitur plus Berufsfachschulabschluss, Berufsgrundschuljahr, gewerbliche/landwirtschaftliche Ausbildung, kaufmännische Ausbildung	Any higher educ. entrance qual. and voc. school certificate, basic voc. training year, completed industrial or agricultural apprenticeship, completed commercial apprenticeship				4Ag, 4Av	IV	2c voc	14–16	15	15	15	15
	12	Schule beendet ohne Abschluss oder Hauptschulabschluss plus Meister-, Techniker- oder gleichwertiger Fachschulabschluss	Left school without school leaving qualification or secondary gen. school leaving cert. and Master craftsman, technician or equivalent certificate				5B	IV	1c	15	13	13	13	13
	13	Realschulabschluss plus Meister-, Techniker- oder gleichwertiger Fachschulabschluss	Intermediate school leaving cert. and Master craftsman, technician or equivalent certificate				5B	IV	2a	15	14	13	14	14
	14	FH-Reife oder Abitur plus Meister-, Techniker- oder gleichwertiger Fachschulabschluss	Any higher educ. entrance qual. and Master craftsman, technician or equivalent certificate				5B	IV	2c voc		15	15	15	15
	15	Abgeschlossenes Studium an Fachhochschule/Ingenieurschule, Schule des Gesundheitswesens	Completed studies at technical/voc. college, health sector school				3B, 5B, 5A l	IIIb, V1	2a, 3a	17	16	16	16	16
DE (1, 2)	16	Hochschule/Universität: Zwischenprüfung, Vordiplom, Bachelor	Intermediate examination, intermediate diploma (university), Bachelor				5Ai, 5Am	V1	2c gen		16	17	17	17
	17	Abgeschlossenes Studium an Hochschule, Universität, Akademie, Polytechnikum (Diplom, Magister, Master, Staatsexamen)	Master of arts, diploma, state examination, master (Magister, Diplom)				5Al	V2	3b	18	18	18	18	18
	18	Promotion; Habilitation	PhD and habilitation				6	V2	3b	20	20	19	19	19
DE (3)	16	Hochschule/Universität: Zwischenprüfung, Vordiplom	Intermediate examination, intermediate diploma (university)				5Ai	V1	2c gen		16	20	18	18

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
	17	Bachelor	Bachelor				5Am	V1	3a	16	16	17	17	17
	18	Abgeschlossenes Studium an Hochschule, Universität, Akademie, Polytechnikum (Diplom, Magister, Master, Staatsexamen)	University degree				5Al	V2	3b	18	18	18	18	18
	19	Promotion; Habilitation	PhD and habilitation				6	V2	3b	20	20	18	20	20

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
DK	0	Ingen skoleuddannelse, ingen erhvervsuddannelse	No school education, no vocational education	0	0	0	0	I	1a		6	0	6	5
	1	1.–6. skoleklasse, ingen erhvervsuddannelse	1.–6. class in school, no vocational education	1	1	1	1	I	1a	6	6	6	6	6
	2	7.–10. skoleklasse, ingen erhvervsuddannelse	7.–10. class in school, no vocational education	2	2	2	2Ag	II	1b	9–10	9	10	9	9
	3	Gymnasium, HF, HH, HTX, ingen erhvervsuddannelse	Upper secondary school, no vocational education	3	3	3	3Ag	IIIa	2c	12–13	13	13	14	14
	4	Erhvervsfaglige uddannelser, håndværkeruddannelser, social og sundhedshjælperuddannelser	Vocational education and training, apprenticeship training in crafts, social and health services	3	3	3	3Cv	IIIb	2a	12–14	13	13	13	13
DK (1)	5	Arbejdslederuddannelser for faglærte	Work leader education for vocational educated	4	-	-	5B	IV	2a		14	14	15	15
	6	Videregående uddannelser på 2–3 år efter gymnasium eller faglig uddannelse	Further education of 2–3 years after upper secondary school	4	-	-	5B	IV	3a	14–15	15	16	15	15
	7	Videregående uddannelser på ca. 4 år efter gymnasium eller faglig uddannelse	Further education of around 4 years after upper secondary sc	5	-	-	5Am	V1	3a	16	16	16	17	17
	8	Bachelor eller kandidateksamen fra universitet	Bachelors or masters degree from university	5	-	-	5Am, 5Al	V1, V2	3b	15–20	18	18	18	19
	9	Overbygning på universitetseksamen, Ph.d., licentiat	Further university education i. e. PhD, Licentiate	6	-	-	6	V2	3b	21–24	21	20	21	21
DK (2, 3)	5	Korte videregående uddannelser (efter faglig uddannelse eller gymnasium) (har som oftest en varighed af 2–3 år, fx socialpædagog, maskintekniker, politi)	Short further education of 2–3 years after upper secondary school, such as social pedagogue, mechanical technician, police	-	4	4	5B	IV	3a	14–15	15	15	15	14
	6	Mellemlang videregående uddannelse (efter faglig uddannelse eller gymnasium) (har som oftest en varighed af 3–4 år, fx teknikumingeniør, lærer, sygeplejerske)	Medium further education of 3—4 years after upper secondary school, such as engineer, teacher, nurse	-	5	5	5Am	V1	3a	16	16	16	16	16
	7	Lang videregående uddannelse (efter faglig uddannelse eller gymnasium) Universitetsuddannelser fx cand.jur., læge, cand.merc., arkitektskolerne, musikkonservatorierne)	Long further education after upper secondary school, university studies such as architecture, medicine, music	-	5	5	5Al	V2	3b	18–20	18	18	19	19
	8	Overbygning på universitetseksamen, Ph.d., licentiat	Further university education i. e. PhD, Licentiate	-	6	6	6	V2	3b	21–24	21	20	21	21

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
EE (2)	1	KIRJAOSKAMATU/НЕГРАМОТНЫЙ/АЯ	No primary education, illiterate	-	0	-	0	I	1a		0	-	-	-
	2	Alghariduseta/Нет начального образования	No primary education, literate	-	0	-	0	I	1a		6	2	2	2
	3	Alghariduse/Начальное образование	Primary education	-	1	-	1	I	1a	6	6	6	6	7
	4	Põhiharidus (mittetäielik keskharidus)/Основное образование (неполное среднее образование)	General basic education (incomplete secondary education)	-	2	-	2Ag	II	1b	9	9	8	8	9
	5	Keskharidus/Среднее образование	General secondary education	-	3	-	3Ag	IIIa	2c gen	12	11	11	11	12
	6	Kutseharidus, õppeaeg alla 3 aasta/õppeaeg 3 aastat või rohkem/Профессиональное образование, обучение менее 3 лет/образование, обучение 3 года и более	Vocational education, 3 year study without basic education	-	1	-	2C	II	1c		10	-	-	-
	7	Kutseharidus koos põhihariduse omandamisega/Профессиональное образование с получением основного образования	Vocational basic education	-	2	-	2Av	II	1c		10	10	10	10
	8	Kutseharidus koos keskhariduse omandamisega, Kutsekeskharidus põhihariduse baasil/Профессиональное образование с получением среднего образования, Профессиональное среднее образование на базе основного образования	Vocational secondary education	-	3	-	3Av	IIIb	2a, 2c voc		11	11	11	11
	9	Kutsekeskharidus keskhariduse baasil/Профессиональное среднее образование на базе среднего образования	Vocational secondary education after secondary education	-	4	-	4Cv	IV	3a	14	13	13	13	13
	10	Keskeri-, tehnikumiharidus pärast põhiharidust/Среднее профессиональное образование, техникум после основного образования	Professional secondary/technical education after basic education	-	3	-	3Av	IIIa	2c voc	13	12	12	12	13
	11	Keskeri-, tehnikumiharidus pärast keskharidust/Среднее профессиональное образование, техникум после среднего образования	Professional secondary/technical education after secondary education	-	5	-	5B	IV	3a		14	14	14	14
	12	Kutsekõrgharidus, Rakenduskõrgharidus (diplomiõpe), Bakalaureus (kõrgharidus)/Профессиональное высшее образование, Прикладное высшее образование (дипломное обучение), Степень бакалавра (высшее образование)	Higher professional education, Applied higher education (Diploma study), Bachelor (higher education)	-	5	-	5B, 5B, 5Am	V1	3a, 3b low	15	16	16	16	17
	13	Magister/Степень магистра	Master's degree	-	6	-	5Al	V2	3b	18	18	18	18	18
	14	Teaduste kandidaat, doktor/Кандидат, доктор наук	Candidate of sciences, PhD	-	6	-	6	V2	3b	22	20	16	17	18

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Table D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
EE (3)	0	Algshariduseta, KIRJAOSKAMATU/Нет начального образования, НЕГРАМОТНЫЙ/АЯ	Without elementary (not completed 4th grade), illiterate	-	-	0	0	I	1a		6	-	-	-
	1	Algharidus/Начальное образование	Elementary (completed 4th grade)	-	-	1	1	I	1a	6	6	4	6	6
	2	Põhiharidus (mittetäielik keskharidus)/Основное образование (неполное среднее образование)	Basic (completed 9th grade)	-	-	2	2Ag	II	1b	9	9	9	9	9
	3	Keskharidus/Среднее образование	Secondary (completed 12th grade)	-	-	3	3Ag	IIIa	2c gen	12	11	11	11	11
	4	Kutseharidus, õppeaeg alla 3 aasta/õppeaeg 3 aastat või rohkem/Профессиональное образование, обучение менее 3 лет/образование, обучение 3 года и более	Vocational education, 3 year study without basic education	-	-	2	2Cv	II	1c		10	10	11	11
	5	Kutseharidus koos põhihariduse omandamisega/Профессиональное образование с получением основного образования	Vocational education with acquisition of basic education	-	-	2	2Av	II	1c		10	9	10	10
	6	Kutseharidus koos keskhariduse omandamisega/Профессиональное образование с получением среднего образования	Vocational education with secondary education	-	-	3	3Av	IIIb	2c voc		11	11	11	12
	7	Kutsekeskharidus põhihariduse baasil/Профессиональное среднее образование на базе основного образования	Vocational education after acquisition of basic education	-	-	3	3av	IIIb	2c voc	12	11	11	11	11
	8	Kutsekeskharidus keskhariduse baasil/Профессиональное среднее образование на базе среднего образования	Vocational education after secondary education	-	-	4	4Cv	IIIa	IV	14	13	13	13	13
	9	Keskeri, tehnikumiharidus pärast põhiharidust/Среднее профессиональное образование,техникум после основного образования	Professional secondary, technical school after basic education	-	-	3	3Av	IIIa	2c voc	13	12	12	12	12
	10	Keskeri, tehnikumiharidus pärast keskharidust/Среднее профессиональное образование, техникум после среднего образования	Professional secondary, technical school after secondary education	-	-	4	5Bs	IV	3a		14	13	14	14
	11	Kutsekõrgharidus/Профессиональное высшее образование	Higher professional education	-	-	5	5Bm	V1	3a	15	15	15	16	16
	12	Rakenduskõrgharidus (diplomiõpe)/Прикладное высшее образование (дипломное обучение)	Applied higher education (diploma study)	-	-	5	5Bm	V1	3a	15	15	15	16	16
	13	Bakalaureus (kõrgharidus)/Степень бакалавра (высшее образование)	Bachelor (higher education)	-	-	5	5Am	V1	3b	16	16	16	16	17
	14	Magister/Степень магистра	Master's degree	-	-	6	5Al	V2	3b	18	18	18	18	18
	15	Teaduste kandidaat, doktor/Кандидат, доктор наук	Candidate of sciences, PhD	-	-	6	6	V2	3b	22	20	18	18	19

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
ES (1)	0	Sin estudios/analfabeto	No schooling/illiterate	0	-	-	0	I	1a		4	0	0	0
	1	Estudios primarios sin terminar (menos de 5 años de escuela o EGB)	Not completed primary education (less then 5 years of EGB)	0	-	-	0	I	1a		4	3	4	4
	2	Estudios primarios completos (incluido 50 EGB)	Primary education	1	-	-	1	I	1b	6	8	8	8	8
	3	EGB, ESO o equivalente (antiguo Bachillerato elemental, graduado escolar, certificado escolar.)	General Basic or Compulsory Secondary Education, Graduate or equivalent (Former lower secondary education)	2	-	-	2Ag	II	2b	10	9	8	9	9
	4	FP1 y Enseñanza técnico-profesional o equiv.	Vocational education, first cycle	3	-	-	3Cv	II	1c	12	12	13	12	12
	5	Bachillerato superior, BUP, o equivalente	General upper secondary education	3	-	-	3Ag	IIIa	2c	12	13	12	12	13
	6	FP2 o equivalente	Vocational education, second cycle	4	-	-	4Av	IIIb	2a	14	14	14	14	14
	7	Estudios superiores 2 o 3 años (en centros de estudio no reglados)	2 or 3 years higher education (not leading to a university degree)	4	-	-	5Bs	IV	3a		16	18	18	18
	8	Arquitecto e ingeniero técnico	Polytechnical studies, short cycle: technical architect or technical engineer (3 years university degree)	5	-	-	5Am	V1	3a	15	17	17	17	17
	9	Diplomado de otras escuelas universitarias o equivalente	Other short cycle university degree (3 years)	5	-	-	5Am	V1	3a	15	17	20	18	18
	10	Arquitecto o ingeniero superior	Polytechnical studies, long cycle: architect, engineer (5 years)	5	-	-	5Al	V2	3b	17	19	20	20	19
	11	Licenciado	Other long cycle university degree (5 years or more)	5	-	-	5Al	V2	3b	17	19	18	18	19
	12	Estudios postgrado o especialización	Postgraduate studies	5	-	-	5Al	V2	3b	18–23	20	22	21	21
	13	Doctorado	PhD	6	-	-	6	V2	3b	21–22	21	20	20	21

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
ES (2, 3)	0	Sin estudios/analfabeto	No schooling/illiterate	-	0	0	0	I	1a		4	8	8	9
	1	Estudios primarios sin terminar	Not completed primary education	-	0	0	0	I	1a		5	5	5	5
	2	Certificado de escolaridad	General Basic Education	-	1	1	2Ag	II	1a	8	8	8	8	8
	3	Hasta 5o de EGB	Five years of General Basic Education	-	1	1	1	I	1a		6	8	9	9
	4	Antigua primaria completa	Former primary education (5 years)	-	1	1	1	I	1b		6	8	8	8
	5	EGB o ESO	General Basic or Compulsory Secondary Education, Graduate	-	2	2	2Ag	II	2b	10	9	8	9	9
	6	Bachillerato elemental	Former lower secondary education	-	2	2	2Ag	II	2b		10	10	11	11
	7	FP1 y Enseñanza Técnico Profesional o equivalente	Vocational education, first cycle	-	2	2	3Cv	II	1c	12	12	12	12	12
	8	Bachillerato superior, BUP o equivalente	General upper secondary education	-	3	3	3Ag	IIIa	2c	12	13	12	13	14
	9	FP2 o equivalente	Vocational education, second cycle	-	3	3	4Ag	IIIb	2a	14	14	14	14	15
	10	Estudios superiores de 2 o 3 años (en centros de estudios no reglados)	2 or 3 years higher education (not leading to a university degree)	-	4	4	5Bs	IV	3a		16	20	16	16
	11	Arquitecto e Ingeniero Técnico	Polytechnical studies, short cycle: technical architect or technical engineer (3 years university degree)	-	5	5	5Am	V1	3a	15	17	20	18	18
	12	Diplomado de otras escuelas universitarias o equivalente	Other short cycle university degree (3 years)	-	5	5	5Am	V1	3a	15	17	18	17	18
	13	Arquitecto o Ingeniero Superior	Polytechnical studies, long cycle: architect, engineer (5 years)	-	5	5	5Al	V2	3b	17	19	20	20	20
	14	Licenciado	Other long cycle university degree (5 years or more)	-	5	5	5Al	V2	3b	17	19	20	19	19
	15	Estudios de postgrado o especialización	Postgraduate studies	-	5	5	5Al	V2	3b	18–23	20	20	20	21
	16	Doctorado	PhD	-	6	6	6	V2	3b	21–22	21	20	20	21

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
FI	1	Peruskoulun ala-aste (1–6 luokat), kansakoulu/Grundskolans lågstadium (årskurserna 1–6), folkskola	completion of grades 1–6 of basic school or folk school	1	1	1	1	I	-	6	7	8	8	8
	2	Peruskoulun yläaste (7–9/10 luokat), keskikoulu/Grundskolans högstadium (årskurserna 7–9/10), mellanskola	completion of grades 7–9 and the voluntary 10th grade of basic or middle school	2	2	2	2Ag	II	-	9–10	9	9	10	10
	3	Lukio, ylioppilas- tai ammatillinen tutkinto/Gymnasium, student- eller yrkesexamen	matriculation examination, voc. qualifications attained in 2–3 years, further and specialist voc. qualifications	3	3	3	3Av, 3Ag	IIIb, IIIa	-	12	12	12	12	13
	5	Opisto- tai korkeakoulututkinto/Examen på institutnivå eller högskoleexamen	voc. college education of 2–3 years, polytechnic degrees, university degrees	5	5	5	5A, 5B	IV, V1, V2	-	14–18	15	15	16	16
	6	Lisensiaatin tai tohtorin tutkinto/Licentiat- eller doktorsexamen	licentiate and doctorate	6	6	6	6	V2	-	19–21	20	20	20	21
FI (1, 2)	0	Vähemmän kuin peruskoulun ala-aste tai vastaava/Mindre än grundskolans lågstadium eller motsvarande	less than primary school or equivalent completed	0	0	0	0	I	-		5	4	8	7
FI (3)	0	Vähemmän kuin peruskoulun ala-aste tai kansakoulu/Mindre än grundskolans lågstadium eller folkskola	less than primary school or folk school completed	0	0	0	0	I	-		5	8	8	7

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
FR	1	Sans diplôme	No qualification	0	0	0	0,1	I	1a		7	8	8	8
	2	Non diplomés jusqu'à la fin 3ème, 2nd, 1ere filière générale	Dropouts from general upper secondary education	2	2	2	(2Bg)	II	2b		10	9	10	10
	3	Non diplomés du CAP, BEP filière professionnelle	Dropouts from vocational upper secondary education	2	2	2	(2Cv)	II	1b		10	12	10	10
	4	CEP	Certificate of primary education	1	1	1	1	I	1b		8	8	8	8
	5	CAP, examen de fin d'apprentissage artisanal	Upper secondary vocational training, craft apprenticeship exam	2	2	2	3Cv	IIIb	1c	11	11	11	11	10
	6	BEP, BP, BEA, BEC, BEI, BES	Upper secondary vocational education and training	2	2	2	3Bv, 3Cv	IIIb	2a	11	12	12	12	12
	7	Brevet élémentaire, Brevet d'étude du premier cycle, brevet des collèges	Lower secondary school certificate	3	3	3	2Ag	II	2b	9–10	10	10	10	11
	8	Baccalauréat général, Brevet supérieur	General university entrance qualification	4	4	4	3Ag	IIIa	2c gen	12	12	12	13	13
	9	brevet de technicien, baccalauréat de technicien, baccalauréat technologique, baccalauréat professionnel	Certificates of general, technological and vocational upper secondary education	4	4	4	3Ag, 3Bv	IIIa	2c voc	12–13	13	14	13	13
	10	DEUG, DUT, BTS, certificat d'aptitude Pédagogique	Certificates awarded upon completion of two years of post-secondary education (general, technological, vocational)	5	5	5	5B, 5Ai	IV	3a	14	14	15	15	15
FR (1, 2)	11	Diplôme universitaire des deuxième et troisième cycles, Doctorat, CAPES, Agrégation, Diplôme de grandes écoles	University diplomas of the second and third cycles, PhD, teacher training, post-graduate certificates, diploma of a grande école	6	6	-	5Am, 5Al, 6	V1, V2	3b	15–20	17	17	17	18
FR (3)	11	Diplôme universitaire du deuxième cycle, CAPES, Diplôme des grandes èccoles	University diplomas of the second cycle, teacher training, diploma of a grande école	-	-	6	5Am, 5Al	V1 (V2)	3b	15–18	17	17	18	17
	12	Diplôme universitaire du troisième cycle (DEA, DESS), Agrégation, Doctorat	University diplomas of the third cycle (post-graduate certificates), PhD	-	-	6	5Al, 6	V2	3b	17–20	18	17	18	19

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
GR	1	Αναλφάβητος/η, μερικές τάξεις του Δημοτικού	Illiterate/not completed primary	0	0	-	0	I	-		3	0	3	3
	2	Δημοτικό	Primary	1	1	-	1	I	-	6	6	6	6	6
	3	Μερική μέση εκπαίδευση (δηλ. μερικές τάξεις εξαταξίου γυμνασίου, νυχτερινό γυμνάσιο, κατώτερη σχολή)	Partial secondary	2	2	-	2AG	II	-	9	9	9	9	10
	4	Πλήρης μέση εκπαίδευση (εξατάξιο γυμνάσιο, λύκειο, μέσες σχολές)	Full secondary	3	3	-	3Ag	IIIa	-	12	12	12	12	13
	5	Ανώτερη Σχολή (πτυχιούχος)	Post secondary/polytechnic	4	4	-	5Bm, 5Am , 5Al	IV, V1	-	15–18	16	16	16	16
	6	Ανώτατη Σχολή (πτυχιούχος)	University degree	5	5	-	5Am, 5Al	V2	-	16–18	17	16	17	17
	7	Μεταπτυχιακό δίπλωμα	Post graduate degree	5, 6	5, 6	-	5Al,6	V2	-	17–18	18	18	20	20
	88	(Δ.Γ.)	Don't know	8	6	-	8	-	-	-	-	-	-	-
GR (2)	8	Διδακτορικός τίτλος	PhD	-	6	-	6	V2	-	19–21	20	-	-	-

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
HU	1	Nem járt iskolába	Never attended school	0	0	0	0	I	1a		0	0	0	0
	2	1–4 Osztály elemi/általános iskola vagy azzal egyenértékű	1–4 form in primary school	0	0	1	0	I	1a	4	4	4	4	5
	3	5–7 Osztály általános iskola vagy azzal egyenértékű	5–7 form in primary school	0	0	1	1	I	1a		6	6	6	7
	4	Befejezett általános iskola vagy azzal egyenértékű	Completed primary school	1	1	1	2	II	1b	8	8	8	8	8
HU (1)	5	Szakmunkásképző	Trade school	2	-	-	(3Cv)	IIIb	1c		11	11	11	11
	6	Befejezetlen középiskola	Not completed secondary school	2	-	-	(2Ag)	IIIb	2b	12	12	12	13	
	7	Érettségi, befejezett középiskola vagy azzal egyenértékű	Completed secondary school (gymnasium or vocational matura)	3	-	-	3Ag, 3Ap, 4Ag	IIIa	2c	12–13	13	12	13	13
	8	Befejezetlen felsőfokú tanintézet (főiskola vagy egyetem)	Uncomplete higher qualification	3	-	-	(3Ag)	IV	2c			-	-	-
	9	Főiskolai diploma	College	5	-	-	5Am	V1	3a	15–16	16	16	16	16
	10	Egyetemi diploma	University	6	-	-	5Al	V2	3b	16–18	17	17	18	19
	11	Posztgraduális végzettség	Postgraduate studies	6	-	-	5Al	V2	3b	17–19	18	18	18	19
	12	Felsőfokú végzettség, tudományos fokozattal	Degree/PhD	6	-	-	6	V2	3b	19–20	19	20	19	19
HU (2, 3)	5	Szakmunkásképző, szakiskola	Vocational (trade school)	-	2	2	(3Cv)	IIIb	1c		11	11	11	11
	6	Befejezetlen középiskola	Uncomplete secondary qualification	-	1	2	(2Ag)	IIIb	2b		12	12	12	12
	7	Érettségi, befejezett középiskola vagy azzal egyenértékű	Gymnasium or vocational school, matura	-	3	3	3Ag, 3Ap, 4Ag	IIIa	2c	12–13	13	12	12	13
	8	Érettségire épülő felsőfokra nem akkreditált szakképzés, középfokú technikum	Sec. technical+matura	-	3	3	(4Av)	IIIa	2c voc		13	12	12	13
	9	Felsőfokra akkreditált szakképzés, felsőfokú technikum	Higher technical+matura	-	4	3	5Bs	IV	3a	14–15	14	12	14	14
	10	Befejezetlen felsőfokú tanintézet (főiskola vagy egyetem)	Uncomplete higher qualification	-	3	4	(3Ag)	IV	2c		13	12	14	14
	11	Főiskolai diploma	College degree completed	-	5	5	5Am	V1	3a	15–16	16	16	16	16
	12	Egyetemi diploma	University degree completed	-	5	5	5Al	V2	3b	16–18	17	17	17	18
	13	Posztgraduális végzettség	Postgraduate qualification	-	6	6	5Al	V2	3b	17–19	18	17	19	19
	14	Felsőfokú végzettség, tudományos fokozattal	Scientific degree	-	6	6	6	V2	3b	19–20	19	17	17	18

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
IE	1	None/Primary not completed (<8 eduyrs, first 2 are ISCED 0)		0	0	0	0	I	1a		6	8	9	9
	2	Primary or equivalent (8–10 eduyrs)		1	1	1	1	I	1b	8	9	9	9	9
	3	Intermediate/Junior/Group Certificate or equivalent		2	2	2	2	II	2b	11	11	11	11	11
	4	Leaving Certificate or equivalent		3	3	3	3Ag, 3Cv	IIIb, IIIa	2c	13–14	13	13	13	13
	5	Diploma/Certificate		4	4	4	4Cv, 5B	IV	2a, 3a	14–17	14	14	14	15
	6	Primary degree		5	5	5	5Am	V1	3b	17–19	16	15	16	16
	7	Post graduate/higher degree		6	6	6	5A,6	V2	3b	18–21	18	18	18	18
IL	0		No formal qualification	0	-	-	0,1	I	1a		0	0	0	1
	1		Lowest formal qualification	1	-	-	(1, 2A)	II	1b		8	8	8	7
	2		Not finish vocational high school (6+2,3,4,5)	2	-	-	(2Cv)	II	1c		10	10	10	10
	3		Full vocational high school without matriculation certificate (6+6)	3	-	-	(3Cv)	IIIb	2a		11	12	12	12
	4		Full vocational high school with matriculation certificate (6+6)	3	-	-	3A	IIIa	2c voc	12	12	12	12	12
	5		Not finish general high school (6+2,3,4,5)	2	-	-	(2Ag)	II	2b		10	10	10	10
	6		Full general high school without matriculation certificate (6+6)	3	-	-	(3Cg)	IIIb	2b		11	12	12	12
	7		Full general high school with matriculation certificate (6+6)	3	-	-	3Ag	IIIa	2c gen	12	12	12	12	12
	8		Yeshiva high school without full matriculation certificate (6+6)	3	-	-	(3Cg)	IIIb	2b		11	12	12	12
	9		Yeshiva high school with full matriculation certificate (6+6)	3	-	-	3Ag	IIIa	2c gen	12	12	12	12	12
	10		post-secondary, non-university (technicians, nurses, teachers etc.)	4	-	-	5Bs	IV	3a	14	14	14	14	14
	11		Not finish University degree	5	-	-	3Ag	IV	3a		15	15	15	15
	12		University BA degree completed	5	-	-	5Am	V1	3b	14–16	16	16	16	16
	13		University MA and above completed	6	-	-	5Al, 6	V2	3b	17-x	18	18	18	18

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
IS	0	Engu, barnaskólanám eða minna	Not completed primary education	-	0	-	0	I	-		0	-	-	-
	1	Grunnskólapróf/gagnfræðapróf	Certificate after 10 years basic education	-	1	-	0,1,2	II	-	10	9	3	9	9
	2	Stutt starfsnám, ár eða minna	Short voc. education, one year or less	-	2	-	3Cvs	II	-	11	10	10	10	10
	3	Lengra starfsnám, iðnnám	Longer voc. education, more than 1 year	-	3	-	3Cv, 4Cv	IIIb	-	12–15	12	12	12	11
	4	Stúdentspróf	Matriculation examination	-	4	-	3Ag	IIIa	-	14	14	14	14	13
	5	Háskólastig, fyrsta gráða, t.d. BA/BS/Bed	University education, first degree	-	5	-	5Am	V1	-	17–20	17	14	15	15
	6	Háskólastig, framhaldsnám	University education, graduate study	-	6	-	5Al, 6	V2	-	20–23	18	18	17	17
IT	1	Senza titolo	No qualification	0	0	-	0	I	1a		3	3	3	3
	2	Licenza elementare	Primary school certificate	1	1	-	1	I	1b	5	5	5	5	5
	3	Licenza media/avviamento professionale	Lower secondary school certificate/old vocational qualification	2	2	-	2Ag, 2Cv	II	1b, 1c	8	8	8	8	9
	4	Diploma scuola media superiore	Upper secondary school certificate	3	3	-	3Ag, 3Bv, 3Cv	IIIb, IIIa	2c, 2a	13	13	13	13	14
IT (1)	5	Diploma universitario	University diploma	4	-	-	5Am	V1	3a	16	16	16	16	16
	6	Laurea	University degree (4–6 years)	5	-	-	5Al	V2	3b	17–19	18	18	18	18
	7	Specializzazione post-laurea	Post-graduate specialisation	6	-	-	5Al, 6	V2	3b	19–24	21	23	21	22
IT (2)	5	Specializzazione post-diploma	Post-secondary specialisation	-	4	-	4Cv	IV	2c voc	14	15	16	16	16
	6	Diploma universitario o Laurea triennale	University diploma or 3-year university degree	-	5	-	5Am	V1	3a, 3b	16	16	18	18	18
	7	Laurea specialistica	Specialist university degree (5 years)	-	5	-	5Al	V2	3b	18	18	18	19	19
	8	Specializzazione post-laurea	Post-graduate specialisation	-	6	-	5Al, 6	V2	3b	19–24	21	21	21	21

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
LU	0	Pas de diplôme/qualifications	No qualifications	0	0	0	0	I	1a		3	9	6	7
	1	Ecole primaire	Primary school	1	1	1	1	I	1a	6	6	4	6	7
	2	Primaire supérieur	Higher primary	1	1	1	1	I	1a		7	9	9	9
	3	Enseignement complémentaire	Complementary education	1	1	1	1	I	1a		8	9	9	10
	4	Certificat d'enseignement secondaire technique inférieur	Certificate of lower secondary technical education	2	2	2	2Ag	II	1b	9	9	11	11	11
	5	Certificat d'apprentissage	Apprenticeship certificate	2	2	2	(3Cv)	IIIb	1c		10	12	11	12
	6	Certificat de Capacité Manuelle : CCM	Certificate of manual capacity (practical vocational training)	3	3	3	3Cv	IIIb	1c	12	12	9	11	11
	7	Certificat d'Initiation Technique et Professionnelle : CITP	Certificate of technical and vocational initiation (first stage of a two-stage apprenticeship)	3	3	3	3Cv	IIIb	1c	11	11	12	11	11
	8	Certificat d'Aptitude Technique et Professionnelle : CATP	Certificate of technical and vocational competence (second stage of a two-stage apprenticeship)	3	3	3	3Cv	IIIb	2a	12	12	12	12	12
	9	Diplôme de technicien (jusque 13e dans le régime technicien)	Upper secondary technician's diploma	3	3	3	3Bv	IIIb	2a	13	13	12	13	13
	10	Bac technique (jusque 13e ou 14e du régime technique)	Technical university entrance qualification	3	3	3	3Av	IIIa	2c voc	14	14	15	14	14
	11	Enseignement secondaire général inférieur	General lower secondary education	2	2	2	2Ag	II	2b	9	10	12	12	12
	12	Diplôme de fin d'études secondaires	General upper secondary school leaving diploma	3	3	3	3Ag	IIIa	2c gen	13	13	13	14	14
	13	Brevet de maîtrise artisanale	Master craftsman's diploma	4	4	4	4Bv	IV	3a	15–16	15	15	13	13
	14	Enseignement supérieur - BAC +2	Higher education - 2 years	5	5	5	5Bs	IV	3a	15	15	16	16	16
	15	Enseignement supérieur - BAC +3	Higher education - 3 years	5	5	5	5Am	V1	3a	16	16	16	17	17
	16	Enseignement supérieur - BAC +4	Higher education - 4 years	5	5	5	5Am	V1	3b	17	17	17	18	18
	17	Enseignement supérieur - BAC +5 ou plus (mais sans l'obtention d'un doctorat)	Higher education - 5 years or more, but no doctorate	5	5	5	5Al	V2	3b	18–20	18	18	19	18
	18	Enseignement supérieur – Doctorat	PhD	6	6	6	6	V2	3b	20	20	20	20	20

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
NL	1	Niet voltooid lager onderwijs	Not completed primary school	0	0	0	0	I	1a		5	8	6	7
	2	Lager onderwijs, basisschool, lager speciaal onderwijs	Primary school or first stage of basic education	1	1	1	1	I	1a	6	6	8	8	8
	3	Lager beroepsonderwijs (LBO), lagere technische school, nijverheidsonderwijs, huishoudschool, VMBO basisberoepsgerichte of kaderberoepsgerichte leerweg	Lower secondary school, technical training	2	2	2	2Bp	II	1c	(10)	9	10	10	10
	4	MULO, ULO, MAVO, VMBO theoretische of gemengde leerweg	Lower secondary school, theoretical training	2	2	2	2Bg	II	1b	10	10	10	11	11
	5	KMBO, VHBO	Short upper secondary professional education	3	3	3	2Cv, 4Ag	IIIb	1c	11, 16	13	14	13	13
	6	Middelbaar beroepsonderwijs, MBO beroepsopleidende leerweg	Upper secondary professional education	3	3	3	3Cv, 3Av, 4Cv	IIIb	2a	12–14	12	12	13	13
	7	MBO-plus voor toegang tot het HBO, korte HBO-opleiding (korter dan 2 jaar)	Post secondary, non-tertiary education	4	4	4	4Av, 4Cv	IIIa	2c voc	12	13	14	14	14
	8	MMS, HAVO	Upper secondary general school	3	3	3	3Ag	IIIa	2c gen	11	11	12	13	13
	9	HBS, VWO, gymnasium, atheneum	Pre-scientific secondary school	3	3	3	3Ag	IIIa	2c gen	12	12	12	14	14
	10	HBO, kweekschool, conservatorium, MO-akten, nieuwe stijl hoge scholen	Tertiary professional education	5	5	5	5Bs, 5Am, 5Al	(IV) V1	3a	13–15	16	16	16	16
	11	Wetenschappelijk onderwijs (WO), universiteit, technische/economische hogeschool oude stijl	Tertiary scientific education, university	5	5	5	5Am, 5Al	V2	3b	16–17	18	18	19	19
	12	Postdoctorale opleiding (leraren- en beroepsopleidingen zoals medici, apotheker)	Tertiary post-scientific education (teachers, doctors)	5	5	5	5Al	V2	3b	18	19	18	19	19
	13	Aio/Oio of andere promotie-opleiding tot graad van doctor	Second stage of tertiary education, Ph.D. education	6	6	6	6	V2	3b	19–22	20	20	20	20

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
NO	0	Ingen utdanning	No education	0	0	0	0	I	-		4	0	4	5
	1	Barneskole/Folkeskole	Primary education (1st. - 7th. class level)	1	1	1	1	I	-	7	4	10	10	10
	2	Ungdomskole/framhaldskole/grunnskole, Ettårig og toårig utdanning etter folkeskole	Lower secondary education	2	2	2	2Ag	II	-	10	9	9	9	10
	3	Videregående grunnutdanning/Realskole,Grunnkurs og VKI videregående utdanning	Upper secondary, basic (11th. - 12th. class level)	3	3	3	3Cv, 3Cg	IIIb	-		11	11	11	12
	4	Videregående avsluttende utdanning, VK II og VK III, gammel gymnasutdanning	Upper secondary, final year (13th. class level+)	3	3	3	3Ag, 3Cv	IIIb, IIIa	-	13	13	12	13	13
	5	Påbygging til videregående utdanning, Teknisk fagskole	Post-secondary non-tertiary education (14th. class level+)	4	4	4	4Cv	IV	-	14–16	14	14	14	14
	6	Universitet/høyskole, 4 år eller mindre med eksamen, Lærerskole, sykepleieskole, Cand mag, Ingeniør	Tertiary education, short (higher education 4 years or short	5	5	5	5Am	V1	-	15–17	16	16	16	16
	7	Universitet/Høyskole, mer enn 4 år med eksamen, Hovedfag, Mastergrad, Sivilingeniør, Siviløkonom	Tertiary education, long (higher education more than 4 years	6	6	5	5Al	V2	-	18–20	18	17	18	18
	8	Forskernivå, Dr grad	Doctoral Degree	6	6	6	6	V2	-	23	21	20	20	21

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
PL	1	Nieukończone podstawowe	Not completed primary education	0	0	0	0, 1	I	1a		6	6	6	5
	2	Ukończone podstawowe	Primary completed (8 grades until 1999)	1	1	1	2Ag	II	1b	8	8	8	8	8
	3	Gimnazjalne	Lower secondary	2	2	2	2Ag	II	1b	9	9			
	4	Zasadnicze zawodowe (także 2-letnia SPR)	Basic vocational	2	2	2	3Cv	IIIb	1c	11–12	11	11	11	11
PL (1)	5	Nieukończone średnie (Ukończone co najmniej 2 lata nauki)	Secondary not completed, but at least two years of study	2	-	-	(2Ag)	IIIb	2b		11	13	12	11
	6	Średnie ogólnokształcące	Secondary comprehensive	3	-	-	3Ag	IIIa	2c gen	12–14	12	12	12	12
	7	Średnie zawodowe (technikum, liceum zawodowe lub liceum techniczne)	Secondary vocational	3	-	-	3Av, 3Ag	IIIa	2c voc	12–14	13	13	13	13
	8	Pomaturalne, policealne	Post secondary	4	-	-	4Bv	IV	3a	13–15	14	14	14	14
	9	Licencjackie, inżynierskie	First stage of tertiary	5	-	-	5Am	V1	3b	15–17	17	17	17	17
	10	Nieukończone wyższe magisterskie lub lekarskie (Ukończone co najmniej 2 lata nauki)	Tertiary not completed, but at least 2 years of study	5	-	-	(3A)	IV	2c gen		16	16	17	17
	11	Ukończone wyższe magisterskie lub lekarskie	Tertiary completed	6	-	-	5Al, 6	V2	3b	17–19	18	17	17	18
PL (2, 3)	5	Średnie ogólnokształcące	Secondary comprehensive	-	3	3	3Ag	IIIa	2c gen	12–14	12	12	12	13
	6	Średnie zawodowe (technikum, liceum zawodowe, techniczne lub profilowane)	Secondary vocational	-	3	3	3Av, 3Ag	IIIa	2c voc	12–14	13	13	13	13
	7	Pomaturalne, policealne	Post secondary	-	4	4	4Bv	IV	3a	13–15	14	14	14	14
	8	Licencjackie, inżynierskie	First stage of tertiary	-	5	5	5Am	V1	3b	15–17	17	17	16	16
	9	Wyższe magisterskie lub lekarskie	Tertiary completed	-	6	6	5Al, 6	V2	3b	17–19	18	17	17	18

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
PT	1	Nenhum	No education	0	0	0	0	I	-		3	3	3	2
	2	1º ciclo do básico (4º classe)	First cycle of basic (4th grade)	1	1	0,1	1	I	-	4	4	4	4	4
	3	2º ciclo do básico (5º e 6º anos/preparatório)	Second cycle of basic (5th or 6th grade)	1	1	1	1	I	-	6	6	6	6	6
	4	3º ciclo do básico (9º ano/5º ano dos liceus)	Third cycle of basic (9 years/5 years of liceum)	2	2	1,2	2	II	-	9	9	9	9	9
	5	Secundário (12º ano/7º ano dos liceus ou equivalente/Propedêutico/serviço cívico)	Secondary (12 years/7 years of high school or equivalent, propedeutics, civic service)	3	3	2,3	3Ag, 3Bv	IIIa, IIIb	-	12	12	12	12	12
	6	Superior politécnico	Polytechnic higher education	3	5	3, 5	5Bm, 5Al	V1	-	15	15	15	15	15
PT (1, 2)	7	Superior universitário	Higher education (university)	5	5	-	5Am, 5Al	V2	-	16–18	17	17	17	17
	8	Mestrado/Doutoramento	Research Master, PhD	5, 6	6	-	6	V2	-	18–25	19	20	19	19
PT (3)	7	Superior universitário (licenciatura)	Higher education (university degree)	-	-	3, 5	5Am, 5Al	V2	-	16–18	17	17	17	17
	8	Pós-graduação (pelo menos 1 ano)	Post-graduate (at least 1 year)	-	-	5	5Al	V2	-	17–20	18	17	17	17
	9	Mestrado	Research Master	-	-	6	6	V2	-	18–20	19	19	19	19
	10	Doutoramento	PhD	-	-	6	6	V2	-	22–25	21	24	24	21

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
RU	1	Начальное образование (7 классов средней школы или меньше)	Primary education	-	-	1	1	I	1b	4	6	7	6	6
	2	Незаконченная средняя школа	Incomplete high school	-	-	2	2Ag	II	2b		8	8	8	8
	3	ПТУ, ФЗУ, ФЗО, лицей без среднего образования	Professional education without secondary education	-	-	2	2Cv	II	1c		10	11	10	10
	4	Законченная средняя школа	Completed secondary school	-	-	3	3Ag	IIIa	2c	11	11	10	10	10
	5	ПТУ, лицей со средним образованием или техническое училище (обучение 2–3 года)	Professional education on secondary level	-	-	3	3Cv	IIIb	2a	10–13	12	11	11	12
	6	Среднее специальное образование: техникум, училище, колледж	Special technical education	-	-	4	5Bm	IIIb/IV	2a/3a	14	13	13	13	13
	7	Несколько курсов вуза, но без диплома	Several grades of college with no certificate	-	-	5	3Ag	V1	3a		14	14	14	15
	8	Получил диплом бакалавра	Bachelor degree from college	-	-	5	5Am	V1	3b	15	15			
	9	Получил диплом магистра	Master degree from college	-	-	5	5Al	V2	3b	17	16			
	10	Законченное высшее образование по 5–6 летней системе (диплом специалиста)	Completed college by 5–6 grade system	-	-	5	5Al	V2	3b	16–17	16	15	16	16
	11	Постдипломное образование: аспирантура, докторантура, ординатура, адъюнктура—без научной степени	Post-college education without scientific degree	-	-	6	6	V2	3b		18	18	18	18
	12	Научная степень (кандидат, доктор наук)	Scientific degree	-	-	6	6	V2	3b	20–23	19	18	18	19

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
SE	1	Ej avslutad folkskola/grundskola	Not finished elementary school	0	0	0	0,1	I	1a		6	8	8	7
	2	Folkskola (7 years)	Elementary school, old	1	1	1	(1)	I	1b		7	7	8	8
	3	Grundskola/Enhetsskola (9 years: 6+3)	Elementary school	1	1	2	2Ag	II	2b	9	9	9	9	9
	4	Realskola/Flickskola	Lower secondary and elementary school, old	2	2	2	(2Ag)	II	2b		10	10	11	11
	5	Fackskola (1963–1970)	Vocational school 1963–1970	2	2	2	(2Bv)	II	2a		11	11	11	11
	6	2-årig gymnasielinje	2 year high school	2	2	3	3Cg, 3Cv	IIIb	2a		11	11	11	12
	7	3- eller 4-årig gymnasielinje (före 1995)	3–4 year high school prior 1995	3	3	3	(3Ag)	IIIa	2c gen		13	12	13	13
	8	Yrkesinriktat gymnasieprogram (efter 1992)	Vocational high school after 1992	3	3	3	3Av	IIIb	2c voc	12	12	12	12	13
	9	Teoretiskt inriktat gymnasieprogram (efter 1992) (t exsamhällsvetarprogrammet eller Naturvetarprogrammet)	Theoretical high school after 1992	3	3	3	3Ag	IIIa	2c gen	12	13	12	13	13
	10	Universitet/Högskola utan examen	University, no exam	5	5	5	3A	IV	2c gen		15	15	15	15
	11	Universitet/Högskola, kortare än 3 år, med examen	University, exam less than 3 years	5	5	5	5Bs	IV	3a	14–15	14	14	15	15
SE (1, 2)	12	Universitet/Högskola, 3 år eller längre, med examen	University, exam more than 3 years	6	6	-	5Am, 5Al, 6	V1, V2	3b	15–22	17	17	17	17
SE (3)	12	Universitet/Högskola, 3 år eller längre, med examen	University, exam more than 3 years	-	-	5	5Am, 5Al	V1, V2	3b	15–19	17	17	17	17
	13	Forskarutbildning	Post-graduate education (Licentiate, PhD)	-	-	6	6	V2	3b	17–22	21	22	21	21

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
SI	1	Nedokončana osnovna šola	Incomplete primary school	0	0	0	0, 1	I	-		6	6	6	6
	2	Dokončana osnovna šola	Completed primary school	1	1	1	2Ag	II	-	8	8	8	8	8
	3	2–3 letna poklicna šola	2–3 year vocational school	2	2	2	3Cv	IIIb	-	11	11	11	11	11
	4	Splošna gimnazija, poklicna gimnazija, štiriletna strokovna šola	General high school, vocational high school, four-year technical school	3	3	3	3Ag, 3Bv	IIIa	-	12–13	12	12	12	13
	5	2 letna višja (strokovna) šola	2 year high (professional) school	4	4	4	5Bs, 5Bm	IV	-	14–16	15	14	15	15
	6	Visoka šola ali fakulteta	Professional higher education or university	5	5	5	5Bm, 5Am, 5Al	V1, V2	-	16–18	17	17	17	17
	7	Magisterij, doktorat	Post-graduate Research Masters, Doctorate	6	6	6	5Al, 6	V2	-	18–22	19	18	19	20
SK	1	Neukončená povinná školská dochádzka	Still in compulsory education	-	-	-	-	I	1a		0	-	-	-
	2	Neukončená základná škola	Incomplete primary	-	0	1	0, 1	I	1a		5	5	5	5
	3	Základná škola	Primary (first stage 4 years, second stage 5 years)	-	2	2	2Ag	II	1b	9	9	9	9	9
	4	Stredná škola bez maturity	Secondary, no upper diploma	-	3	3	3Cv	IIIb	2a, 2b	12	12	12	12	12
	5	Stredná škola s maturitou	Secondary, upper diploma	-	3	3	3Av, 3Ag	IIIa	2c	13	13	13	13	13
	6	Nadstavbové štúdium	Higher (followup courses)	-	4	4	3Av (4)	IIIa	2c	14	14	14	14	14
	7	Vysoká škola—bakalárske štúdium	Tertiary, BA (3 years)	-	5	5	5Am	V1	3a	16	16	17	17	17
	8	Vysoká škola—magisterské štúdium	Tertiary, MA (4–6 years)	-	5	5	5Al	V2	3b	17–18	17	17	17	17
	9	Postgraduálne štúdium—vedecká výchova	Post-graduate, PhD	-	6	6	5Al, 6	V2	3b	19–21	19	17	18	18

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TABLE D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
TR	0	Okuma-yazma bilmiyor, Okuma-yazma biliyor ama okul bitirmemiş/diplomasız	Illiterate, no diploma	-	0	-	0	I	-		0	0	0	1
	1	İlkokul mezunu (5 yıl)	Primary school diploma, 5 years of schooling	-	1	-	1	I	-		5	5	5	5
	2	İlköğretim mezunu (8 yıl), Genel ortaokul mezunu, Mesleki ortaokul mezunu	Secondary diploma, 8 years of schooling (general or vocational)	-	2	-	2Ag	II	-	8	8	8	8	8
	3	Genel lise mezunu, Mesleki lise mezunu	High School diploma, 11 years of schooling (general or vocational)	-	3	-	3Ag, 3Av	IIIa, IIIb	-	11	11	11	11	11
	5	Universite veya yüksekokul mezunu	University or college graduate	-	5	-	5Bs, 5Am	V1, V2	-	13–15	15	15	15	15
	6	Master ve ya doktora derecesi sahibi	Post-graduate degree; MA or doctorate holder	-	6	-	5Al, 6	V2	-	17–21	17	16	18	19

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Table D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
UA	0	Неповна початкова освіта (менше 4-х класів середньої школи)/Неполное начальное образование (менее 4-х классов средней школы)	0 Not completed primary education (less than 4 years of secondary school)	-	0	0	0	I	-		4	4	4	8
	1	Початкова освіта (4–7 класів середньої школи)/Начальное образование (4–7 классов средней школы)	1 Primary education (4–7 years of secondary school)	-	1	1	1	I	-	7	7	7	7	7
	2	Неповна середня освіта (8–9 класів середньої школи)/Неполное среднее образование (8–9 классов средней школы)	2 Not completed secondary education (8–9 years of secondary school)	-	2	2	2Ag	II	-	9	9	9	9	9
	3	Повна середня освіта (10–11 класів середньої школи)/Полное среднее образование (10–11 классов средней школы)	3 Completed secondary education (10–11 years of secondary school)	-	3	3	3Ag	IIIa, IIIb	-	11	11	10	10	11
	4	Середня спеціальна освіта (технікум, вище за середню, але не вища)/Среднее специальное образование (техникум, выше среднего, но не высшее)	4 Secondary technical education (college, more than secondary, but not high)	-	4	4	4Bv, 5Bs	IV	-	12–14	13	13	13	12
	5	Перша ступінь вищої освіти (бакалавр)/Первая стадия высшего образования (бакалавр)	5 First stage of high education (bachelor)	-	5	5	5Am	V1	-	15	15	15	15	15
	6	Повна вища освіта (спеціаліст, магістр, аспірантура, вчений ступінь)/Полное высшее образование (специалист, магистр, аспирантура, ученая степень)	6 Completed high education (specialist, master, post-graduate, scientific degree)	-	6	6	5Al, 6	V2	-	16–22	17	15	15	15

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Table D.2: Mapping of ESS country-specific education categories to cross-national education variables (*continued*)

ESS country-specific education categories				edulvl			ISCED	ES-	CAS-	Years of educ.				
Country	Val.	Questionnaire	English label	r1	r2	r3	97	ISCED	MIN	map	h-years	mod	med	mean
UK (1, 3)	0	no qualification, left school before age 11		0	-	0	0	I	1a		5	5	5	5
	1	no qualification, left school at age 11 to 13		1	-	1	1	I	1a	6–8	7	8	8	8
	2	no qualification, left school after age 14		2	-	2	2	I	1b	9	10	11	11	11
	3	Section 1: GCSE, CSE, GCE O-level, School Certificate or Matriculation, Scottish SCE Ordinary Grade, Scottish Standard Grade, Scottish Leaving Certificate, SUPE Ordinary, Northern Ireland Junior Certificate, Apprenticeship completed, RSA/OCR Certificate or (First) Diploma City and Guilds Certificate part I or Craft/Intermediate/Ordinary/Part II, NVQ/SVQ Level 1 or 2, GNVQ/GSVQ Foundation or Intermediate Level or equivalent		2	-	2	2A g (3Cg), 3Cp, 3Cv	II	1c, 2a, 2b	10–12	11	11	11	12
	4	Section 2: GCE A-level, S-level, A2-level, AS-level, Scottish Higher Grades, Scottish Higher-Still, Scottish SCE/SLC/SUPE at Higher Grade, Scottish Higher School Certificate, Certificate of Sixth Year Studies, Northern Ireland Senior Certificate, RSA/OCR Advance Diploma, City, Guilds Advanced/Final/Part III, BTEC/Edexcel/BEC/TEC General ordinary National Certificate or Diploma (ONC or OND) ,NVQ/SVQ Level 3, GNVQ/GSVQ Advanced Level, or equivalent		3	-	3	3Ag, 3Av	IIIa, IIIb	2c	12–13	13	13	13	13
	5	Section 3: RSA/OCR Higher Diploma, City, Guilds Full Technological/Part IV, NVQ/SVQ Level 4 or 5, or equivalent		4	-	4	5Bs	IV	?	11–13?	14	12	13	13
	6	Section 4: University/CNAA Bachelor Degree, Masters Degree, Diploma or M.Phil., BTEC/Edexcel/BEC/TEC Higher National Certificate or Diploma (HNC or HND) (5B), Teaching qualification, Nursing qualification or equivalent		5	-	5	5Bs, 5Am, 5Al	IV, V1, V2	3a, 3b	14–18	17	17	17	17
	7	Section 5: Ph.D., D.Phil or equivalent		6	-	6	6	V2	3b	19	20	20	20	20
UK (2)	0	no qualification, left school before age 11		-	-	-	0	I	1a		5	0	0	0
	1	no qualification, left school at age 11 to 13		-	-	-	1	I	1a		7	7	6	6
	2	no qualification, left school after age 14		-	-	-	2A	I	1b		10	10	10	10
	3	CSE grade 2–5/GCSE grades D-G or equivalent		-	-	-	2A (3C)	II	2b	11	11	11	11	11
	4	CSE grade 1/O-level/GCSE grades A-C or equivalent		-	-	-	2A (3C)	II	2b	11	11	11	11	12
	5	A-level, AS-level or equivalent		-	-	-	3Ag	IIIa	2c	12–13	13	13	13	13
	6	Degree/postgraduate qualification or equivalent		-	-	-	5Am, 5Al, 6	V1, V2	3b	15–19	17	17	17	16

Explanatory notes on page 415

TABLE E.1: Construct validation using ISEI scores, R^2s not adjusted

Country	ESS round	N	k	adj. R^2	relative R^2				
				CSEV	ISCED	CASMIN	ES-ISCED	h-years	a-years
AT	1	1483	5	22.7	.	.	.	98.5	92.7
AT	2	1354	6	36.4	.	.	.	90.8	80.9
AT	3	1470	6	32.2	.	.	.	89.0	67.5
BE	1	1093	11	43.5	89.6	96.5	99.0	89.9	62.5
BE	2	1100	11	44.4	87.5	98.1	96.5	85.1	51.8
BE	3	1101	11	44.2	84.9	99.6	98.3	88.5	52.3
BG	3	806	6	53.4	100.0	.	.	86.5	96.4
CH	1	1359	15	33.3	83.8	93.3	91.9	91.7	60.7
CH	2	1448	15	33.2	68.7	93.0	92.6	95.0	60.2
CH	3	1206	13	49.5	77.1	93.9	97.8	96.9	72.3
CY	3	623	6	47.1	83.2	.	.	79.7	87.9
CZ	1	786	11	49.0	69.2	99.4	95.2	84.7	71.6
CZ	2	1721	11	51.6	69.1	96.7	96.2	86.5	79.7
DE	1	1841	17	42.9	56.2	95.8	92.4	89.7	74.3
DE	2	1756	17	44.9	70.6	94.9	96.4	95.9	71.3
DE	3	1788	18	45.5	68.3	93.4	93.2	90.9	65.9
DK	1	987	10	33.5	79.2	92.1	98.3	86.3	89.1
DK	2	967	9	42.2	79.3	96.7	99.9	84.5	67.1
DK	3	974	9	44.7	83.2	97.5	99.9	92.0	43.8
EE	2	1175	12	35.0	82.9	.	96.2	93.4	94.1
EE	3	876	15	34.9	77.6	86.0	94.5	90.0	88.9
ES	1	817	14	52.5	92.1	98.5	96.1	92.7	74.3
ES	2	832	17	40.9	83.1	95.6	95.8	90.5	75.1
ES	3	1092	17	45.0	82.0	97.8	96.2	85.3	68.6
FI	1	1237	6	35.5	94.5	.	.	80.2	96.2
FI	2	1247	6	37.8	92.4	.	.	88.4	97.3
FI	3	1145	6	38.9	95.0	.	.	87.0	82.7
FR	1	894	11	40.5	81.5	99.7	.	91.1	72.5
FR	2	1129	11	39.6	81.4	98.3	.	92.1	75.5
FR	3	1329	12	43.2	75.7	97.3	96.3	89.6	67.5
GR	1	1249	7	56.1	95.1	.	.	90.6	80.2
GR	2	1266	7	44.2	92.2	.	.	94.1	82.6
HU	1	1040	11	51.5	81.3	99.8	99.2	91.7	78.2
HU	2	980	14	58.5	78.2	96.6	98.4	90.7	69.0
HU	3	908	14	55.5	84.6	94.0	98.4	89.9	87.1

Continued on the next page

TABLE E.1: Construct validation using ISEI scores, R^2s not adjusted

Country	ESS round	N	k	adj. R^2	relative R^2				
				CSEV	ISCED	CASMIN	ES-ISCED	h-years	a-years
IE	1	1265	7	39.2	.	.	.	96.0	72.7
IE	2	1428	7	36.7	.	.	.	94.4	67.0
IE	3	1043	7	36.9	.	.	.	92.9	73.5
IL	1	1268	14	34.5	74.5	98.4	98.4	95.3	95.3
IS	2	319	6	30.7	73.2	.	.	75.2	54.0
IT	1	689	7	44.0	95.1	.	.	98.1	88.8
IT	2	803	8	46.8	95.7	.	.	96.3	83.5
LU	1	786	19	45.1	82.8	92.1	92.7	88.2	77.6
LU	2	1046	19	52.3	79.5	89.9	92.0	80.8	61.0
NL	1	1620	13	34.7	87.7	99.0	91.5	90.7	62.2
NL	2	1276	13	35.5	86.7	97.7	93.4	89.7	67.2
NL	3	1286	13	37.0	91.4	93.2	93.5	93.7	59.7
NO	1	1223	9	32.9	90.4	.	.	94.6	92.6
NO	2	1205	8	32.1	81.6	.	.	91.9	82.1
NO	3	1163	8	31.5	81.7	.	.	92.4	69.1
PL	1	1266	10	54.4	76.4	97.4	99.0	93.3	91.8
PL	2	1072	8	45.4	87.5	98.6	100.0	95.2	90.0
PL	3	1031	8	50.3	85.2	97.7	99.8	93.5	90.2
PT	1	870	8	45.0	95.9	.	.	96.9	94.7
PT	2	1053	8	46.7	96.8	.	.	95.7	95.9
PT	3	1236	10	53.7	95.7	.	.	95.5	91.4
RU	3	1371	12	47.7	58.7	98.8	98.5	88.6	80.3
SE	1	1266	12	39.8	78.8	90.4	.	93.3	83.5
SE	2	1212	12	42.4	83.4	94.0	.	92.2	83.1
SE	3	1186	13	35.8	83.1	92.2	.	88.8	84.5
SI	1	914	7	53.3	83.7	.	100.0	92.6	85.5
SI	2	699	7	58.8	83.5	.	100.0	93.5	69.5
SI	3	844	7	53.1	80.8	.	100.0	91.8	81.5
SK	2	851	8	41.4	78.9	.	99.2	90.0	59.5
SK	3	1015	8	47.2	84.3	.	99.1	91.9	60.4
TR	2	657	6	49.6	100.0	.	.	88.3	88.4
UA	2	1134	7	44.2	57.6	.	.	95.4	73.1
UA	3	1120	7	46.2	60.0	.	.	93.2	46.6
UK	1	1303	8	32.5	79.2	.	.	95.7	74.9
UK	2	1070	7	34.2	.	.	.	93.9	54.7
UK	3	1473	7	26.3	68.6	.	.	90.8	74.4

Source: European Social Survey 2002-2007, own calculations. Respondents aged 25-64. Weighted using the design weight (*dweight*).
Notes:
'N'=number of valid cases;
'k'=number of categories in the CSEV.
Model 1: absolute R^2s resulting from regressing ISEI scores on the CSEVs.
Models 2-6: relative R^2s from regressing ISEI scores on ISCED, CASMIN, ES-ISCED, theoretical and actual *years of education* (relative to Model 1).

TABLE E.2: Construct validation using EGP classes, R^2s not adjusted

Country	ESS round	N	k	adj. R^2	relative R^2				
				CSEV	ISCED	CASMIN	ES-ISCED	h-years	a-years
AT	1	1485	5	12.0	.	.	.	93.4	85.8
AT	2	1358	6	14.3	.	.	.	81.6	77.0
AT	3	1474	6	14.0	.	.	.	76.6	66.4
BE	1	1094	11	20.5	82.7	93.0	94.9	77.6	58.7
BE	2	1104	11	19.0	84.1	95.8	93.3	77.5	57.9
BE	3	1113	11	19.4	80.7	98.0	96.0	80.7	49.5
BG	3	809	6	22.7	100.0	.	.	89.8	92.1
CH	1	1368	15	18.4	81.5	90.3	88.2	80.3	60.0
CH	2	1451	15	18.0	75.5	90.2	86.4	83.9	57.2
CH	3	1209	13	22.5	77.3	93.8	91.8	85.8	71.9
CY	3	623	6	18.2	87.4	.	.	92.7	89.2
CZ	1	787	11	25.8	59.6	93.9	89.8	80.2	65.9
CZ	2	1728	11	24.0	58.5	94.6	92.9	82.1	69.8
DE	1	1843	17	21.2	70.1	90.9	86.1	85.4	74.5
DE	2	1759	17	21.4	74.1	89.3	90.4	79.6	63.4
DE	3	1798	18	23.1	71.7	89.2	87.5	80.5	66.8
DK	1	987	10	21.9	86.8	95.7	98.8	83.8	81.8
DK	2	970	9	20.4	80.5	93.7	97.9	80.2	66.5
DK	3	977	9	23.8	85.0	95.1	99.3	88.1	51.6
EE	2	1178	12	17.3	85.2	.	90.8	87.6	94.1
EE	3	879	15	17.8	73.2	83.6	86.5	80.6	79.9
ES	1	820	14	23.7	86.8	93.5	89.9	83.5	69.6
ES	2	846	17	17.2	74.9	83.7	82.8	75.6	66.0
ES	3	1092	17	20.8	79.0	90.2	86.2	75.3	66.9
FI	1	1249	6	18.2	98.1	.	.	89.5	92.4
FI	2	1258	6	19.0	96.0	.	.	91.7	95.1
FI	3	1163	6	19.7	96.7	.	.	88.3	84.6
FR	1	914	11	20.7	76.6	96.7	.	78.9	70.8
FR	2	1139	11	19.9	81.5	97.0	.	88.7	76.2
FR	3	1344	12	22.8	75.2	95.0	89.5	82.1	69.2
GR	1	1257	7	20.2	94.5	.	.	92.1	84.7
GR	2	1266	7	18.1	92.8	.	.	89.1	79.8
HU	1	1040	11	24.8	76.1	98.8	95.6	88.2	73.2
HU	2	980	14	29.4	68.4	89.8	90.8	82.6	61.9
HU	3	921	14	28.1	81.6	92.6	95.2	86.7	80.2
IE	1	1265	7	18.9	.	.	.	92.1	76.4
IE	2	1428	7	19.0	.	.	.	92.8	76.1
IE	3	1043	7	18.1	.	.	.	91.3	83.2
IL	1	1275	14	19.1	80.4	92.2	93.6	83.9	87.9
IS	2	320	6	17.1	76.1	.	.	69.9	63.4

Continued on the next page

TABLE E.2: Construct validation using EGP classes, R^2s not adjusted

Country	ESS round	N	k	adj. R^2	relative R^2				
				CSEV	ISCED	CASMIN	ES-ISCED	h-years	a-years
IT	1	689	7	16.2	95.8	.	.	90.2	87.2
IT	2	804	8	20.9	95.9	.	.	87.6	77.8
LU	1	798	19	25.0	79.7	85.8	86.0	77.0	69.4
LU	2	1046	19	26.5	74.8	83.6	84.4	69.8	57.4
NL	1	1643	13	17.5	82.9	93.9	86.1	80.6	58.6
NL	2	1290	13	17.6	85.3	94.4	89.5	84.4	66.1
NL	3	1293	13	17.0	89.8	90.6	90.1	86.4	63.1
NO	1	1242	9	17.5	93.8	.	.	89.2	88.6
NO	2	1208	8	19.1	91.5	.	.	90.3	79.0
NO	3	1170	8	20.1	88.3	.	.	89.8	69.6
PL	1	1269	10	20.6	75.8	96.2	98.2	86.0	84.5
PL	2	1078	8	18.4	82.8	96.4	97.8	89.4	87.8
PL	3	1040	8	20.2	78.4	96.2	98.2	85.2	84.2
PT	1	870	8	18.9	95.7	.	.	90.3	88.9
PT	2	1059	8	17.8	95.6	.	.	92.5	93.2
PT	3	1236	10	20.1	91.6	.	.	89.7	82.1
RU	3	1380	12	20.8	69.6	96.5	95.9	94.6	82.7
SE	1	1279	12	21.0	81.1	89.8	.	88.5	79.7
SE	2	1220	12	20.9	81.3	90.8	.	84.7	75.8
SE	3	1198	13	19.8	81.3	90.7	.	82.6	76.1
SI	1	920	7	20.4	77.3	.	100.0	84.6	77.3
SI	2	699	7	23.6	72.9	.	100.0	85.7	63.9
SI	3	845	7	21.3	74.6	.	100.0	84.6	73.0
SK	2	858	8	18.3	69.5	.	96.5	79.9	61.8
SK	3	1028	8	19.9	77.6	.	98.8	88.1	61.9
TR	2	661	6	18.7	99.8	.	.	89.9	86.9
UA	2	1134	7	19.2	74.5	.	.	89.4	74.7
UA	3	1126	7	20.6	75.3	.	.	88.9	64.7
UK	1	1304	8	16.6	84.2	.	.	90.6	78.0
UK	2	1073	7	16.7	.	.	.	88.8	67.0
UK	3	1473	7	15.0	84.2	.	.	89.1	77.7

Source: European Social Survey 2002-2007, own calculations. Respondents aged 25-64. Weighted using the design weight (*dweight*).
Notes:
'N'=number of valid cases;
'k'=number of categories in the CSEV.
Model 1: absolute Pseudo R^2s resulting from regressing EGP classes on the CSEVs.
Models 2-6: relative Pseudo-R^2s from regressing EGP classes on ISCED, CASMIN, ES-ISCED, theoretical and actual *years of education* (relative to Model 1).

F

SUGGESTIONS: ADDITIONAL MATERIAL

A Welche der folgenden Bildungsgänge oder Schulen haben Sie besucht?
Bitte kreuzen Sie alle zutreffenden Bildungsgänge an und geben das Jahr an, in welchem Sie diesen Bildungsgang verlassen haben.

0.	Keine, Bildung im Ausland erworben	☐	_____
1.	Grundschule	☐	_____
2.	Hauptschule/Hauptschulzweig einer integrierten integrierte Haupt- und Realschule (Sekundarschule, Mittelschule, Regelschule, Regionale Schule, erweiterte Realschule) oder Volksschule (auch Abendhauptschule)	☐	_____
3.	Realschule/Realschulzweig einer integrierten Haupt- und Realschule (Sekundarschule, Mittelschule, Regelschule, Regionale Schule, erweiterte Realschule) (auch Abendrealschule)	☐	_____
4.	Gesamtschule	☐	_____
5.	Gymnasium, berufliches Gymnasium, Fachgymnasium	☐	_____
6.	Anlernausbildung	☐	_____
7.	Berufsschule, Lehrausbildung	☐	_____
8.	Berufsfachschule, Berufskolleg	☐	_____
9.	Schule des Gesundheitswesens (1-jährig)	☐	_____
10.	Fachoberschule	☐	_____
11.	Berufsoberschule	☐	_____
12.	Abendschule, Abendgymnasium, Kolleg	☐	_____
13.	Schule des Gesundheitswesens (2–3-jährig)	☐	_____
14.	Fachschule, Fachakademie (auch Fachschule der ehem. DDR)	☐	_____
15.	Berufsakademie	☐	_____
16.	Bachelor- oder Diplomstudium an einer Fachhochschule, Hochschule für öffentliche Verwaltung/Verwaltungsfachhochschule (oder nicht weiter spezifizierte Hochschule)	☐	_____
17.	Masterstudium an einer Fachhochschule, Hochschule für öffentliche Verwaltung/Verwaltungsfachhochschule (oder nicht weiter spezifizierte Hochschule)	☐	_____
18.	Bachelorstudium an einer Universität, Pädagogischen Hochschule, Kunst- oder Musikhochschule, Technischen Universität, philosophisch-theologischen Hochschule	☐	_____
19.	Master-, Magister-, Diplomstudium oder auf das Staatsexamen vorbereitendes Studium an einer Universität, Pädagogischen Hochschule, Kunst- oder Musikhochschule, Technischen Universität, philosophisch-theologischen Hochschule	☐	_____
20.	Promotionsstudium	☐	_____

FIGURE F.1: Example country-specific data collection instrument on educational programmes attended for Germany

B1 Welche der folgenden Bildungsabschlüsse haben Sie erworben?
Bitte kreuzen Sie alle zutreffenden Bildungsgänge an und geben das Jahr an, in welchem Sie den jeweiligen Bildungsgang abgeschlossen haben.

0.	kein Abschluss oder ausländischer Abschluss	☐ → B2
1.	Erster allgemein bildender Schulabschluss (Hauptschulabschluss, Volksschulabschluss, Sekundarabschluss I), Abgangszeugnis der 8. oder 9. Klasse der polytechnischen Oberschule der ehem. DDR	☐ _____
2.	Mittlerer Schulabschluss ohne Qualifikation für die gymnasiale Oberstufe (Realschulabschluss, mittlere Reife, Fachoberschulreife, qualifizierter Sekundarabschluss I), Abschluss der polytechnischen Oberschule der ehem. DDR nach der 10. Klasse	☐ _____
3.	Mittlerer Schulabschluss mit Qualifikation für die gymnasiale Oberstufe (qualifizierter/erweiterter Realschulabschluss, erweiterter Sekundarabschluss I)	☐ _____
4.	Abschluss einer Anlernausbildung, Teilfacharbeiterabschluss	☐ _____
5.	Abschluss einer 1-jährigen Schule des Gesundheitswesens	☐ _____
6.	Abschlusszeugnis der Berufsschule und Lehrabschluss (Gesellenbrief, Kaufmannsgehilfenbrief, Facharbeiterbrief)	☐ _____
7.	Berufsqualifizierender Abschluss einer Berufsfachschule	☐ _____
8.	Fachhochschulreife	☐ _____
9.	Fachgebundene Hochschulreife	☐ _____
10.	Allgemeine Hochschulreife (Abitur), Abschluss der erweiterten Oberschule der ehem. DDR	☐ _____
11.	Beruflicher Zweitabschluss (Lehre oder Berufsfachschule)	☐ _____
12.	Abschluss einer 2–3-jährigen Schule des Gesundheitswesens	☐ _____
13.	Meisterbrief oder äquivalenter Fachschulabschluss (Techniker, Erzieher u.a.)	☐ _____
14.	Diplom (BA)	☐ _____
15.	Diplom (FH)	☐ _____
16.	Bachelor (B.A., B.Sc.)	☐ _____
17.	Magister, Diplom (Universität)	☐ _____
18.	Master (M.A., M.Sc.) als Zweitabschluss	☐ _____
19.	1. Staatsexamen	☐ _____
20.	2. Staatsexamen	☐ _____
21.	Doktorgrad	☐ _____

B2 Falls 'kein Abschluss oder Abschluss aus dem Ausland' bei B1:
Für wie viele Jahre sind Sie zur Schule gegangen? ☐

B3 Falls 'ausländischer Abschluss': Bitte nennen Sie die konkrete Bezeichnung Ihres Abschlusses. ☐

FIGURE F.2: Example country-specific data collection instrument on educational qualifications for Germany

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ACRONYMS

AES	Adult Education Survey
ALL	Adult Literacy and Life Skills Survey
BEA	*Brevet d'Enseignement Agricole*, , Certificate of agricultural education, FR
BEC	*Brevet d'études commerciales*; 'Certificate of management education', FR
BEI	*Brevet d'Enseignement Industriel*; 'Certificate of education in manufacturing', FR
BEP	*Brevet d'études professionnelles*; 'Certificate of vocational training', FR
BES	*Brevet d'Enseignement Social*, ; 'Certificate of social education', FR
BOS	*Berufsoberschule*, post-secondary vocational school offering upper-secondary general education, DE
BP	*Brevet professionnel*; 'Master crafts certificate', FR
BT	*Brevet de technicien*; 'Technician's certificate', FR
BTS	*Brevet de technicien supérieur*, higher technician's certificate (non-university tertiary education), FR
CAI	Computer-Assisted Interview
CAP	*Certificat d'aptitude professionelle*; 'Certificate of vocational capacity', FR
CAPES	*Certificat d'aptitude au professorat de l'enseignement secondaire*, qualification for teaching at the upper secondary level, FR
CAPI	Computer-Assisted Personal Interview
CASMIN	Comparative Analysis of Social Mobility in Industrial Nations project, often used as a shortcut for the education scheme originally developed therein.
CATI	Computer-Assisted Telephone Interview
CEP	*Certificat d'études primaires*; 'primary education certificate', FR
CESSDA	Council of European Social Science Data Archives
CLA	Classification of Learning Activities
CSE	*Certificate of Secondary Education*; 'outdated lower secondary education certificate awarded at secondary modern schools', UK
CSEV	country-specific education variable
DEA	*Diplôme d'études approfondies*; post-graduate diploma after five years of study, FR
DESS	*Diplôme d'études supérieures spécialisées*; 'diploma of specialised higher education', post-graduate qualification after five years of higher education, FR
DEUG	*Diplôme d'Études Universitaires Générales*; 'diploma of general university education', FR
DFES	UK Department for Education and Skills, split into the Department of Children, Schools and Families and the Department for Innovation, Universities and Skills in 2007.

DUT	*Diplôme universitaire de technologie*; 'diploma of technical university studies', FR
EAG	OECD's "Education at a Glance" Series
EB	Eurobarometer
EBB	*Enquête Beroepsbevolking*, Dutch LFS
EC	European Commission
ECHP	European Communities Household Panel
EES	European Election Studies
EFTA	European Free Trade Association, today consisting of IS, Liechtenstein, NO and CH
EGP	Erikson-Goldthorpe-Portocarero social class scheme, see Erikson et al. (1979)
EQF	European Qualifications Framework for Lifelong Learning
EQUALSOC	Network of Excellence on Economic Change, Quality of Life and Social Cohesion, funded by the EU's Sixth Framework Programme (running from September 2005 to August 2010)
ES-ISCED	European Survey Version of ISCED 97, introduced in Section 6.3.
ESS	European Social Survey
ETS WG	EUROSTAT Working Group on Education and Training Statistics
EU-LFS	European Union Labour Force Survey
EU-SILC	European Union Survey on Income and Living Conditions
EU	European Union
EVS	European Value Survey
EUROSTAT	the Statistical Office of the European Communities
EURYDICE	Information Network on Education in Europe, established by the European Commission and Member States in 1980. "Eurydice is an institutional network for gathering, monitoring, processing and circulating reliable and readily comparable information on education systems and policies throughout Europe" (`http://eacea.ec.europa.eu/portal/page/portal/Eurydice/AboutEurydice`)
FFS	Fertility and Family Surveys
FH	*Fachhochschule*; 'University of applied science/polytechnic college', DE, CH
FNQ	Framework of national qualifications
FOS	*Fachoberschule*
FP 1	*Formación Profesional de primer grado*; 'first level of vocational training', ES
FP 2	*Formación Profesional de segundo grado*; 'second level of vocational training', ES
FRG	Federal Republic of Germany
GCE A-Level	*General Certificate of Education, Advanced Level*, UK
GCE O-Level	*General Certificate of Education, Ordinary Level*, UK
GCSE	*General Certificate of Secondary Education*, UK
GDR	German Democratic Republic

GESIS	*Gesellschaft Sozialwissenschaftlicher Infrastruktureinrichtungen e.V.* ('German Social Science Infrastructure Services'). One of GESIS' departments used to be the *Zentrum für Umfragen, Methoden und Analysen* ('Centre for Survey Research and Methodology').
GML	German Microdata Lab
GNVQ	*General National Vocational Qualification*
HAVO	*hoger algemeen voortgezet onderwijs*; 'higher general secondary education', NL
HBO	*Hoger beroebsonderwijs*; 'higher vocational education', NL
HNC	*Higher National Certificate*, UK
HND	*Higher National Diploma*, UK
IBE	International Bureau of Education
IALS	International Adult Literacy Survey
ILO	International Labour Office
INES	OECD Education Indicators Programme, part of the Directorate for Education
INES TG	OECD OECD Education Indicators Programme (INES) Technical Group
INSEE	*Institut National de Statistique et d'études économiques*; the French NSI
IQR	Inter-quartile range
IQV	Index of qualitative variation
ISCED	International Standard Classification of Education
ISCED 78	International Standard Classification of Education, adopted by the UNESCO General Conference in 1978
ISCED 97	International Standard Classification of Education, adopted by the UNESCO General Conference in 1997
ISCO 88	International Standard Classification of Occupations, developed by the ILO and revised in 1988
ISEI	International Socio-Economic Index
ISSP	International Social Survey Programme
KMBO	*Korte Middelbar Beroebsonderwijs*; 'short secondary vocational education', NL
LEA	Local Education Authority, UK
LFS	Labour Force Survey
MAVO	*middelbaar algemeen voortgezet onderwijs*; 'general lower secondary education', NL
MBO	*Middelbar Beroebsonderwijs*; 'secondary vocational education', NL
NEAC	National Educational Attainment Classification
NQF	National Framework of Qualifications
NSD	Norwegian Social Science Data Services, the data archive responsible for processing and distributing ESS-related files and ESS data. `http://www.nsd.uib.no/english`; `http://ess.nsd.uib.no`.
NSI	National Statistical Institute
NS-SeC	National Statistics Socio-economic Classification
NVQ	*National Vocational Qualification*, UK
OECD	Organisation for Economic Co-operation and Development

OECD INES B	OECD INES Network on Outcomes of Education
ONS	Office of National Statistics, UK
PAPI	Paper and Pencil Interview
PIAAC	Programme for the International Assessment of Adult Competencies
PISA	Programme for International Student Achievement
QNHS	Quarterly National Household Survey; Ireland's LFS
SAMQ	Self-Administered Mail Questionnaire
S.D.	standard deviation
SEI	socioeconomic index
SHARE	Survey of Health, Ageing and Retirement in Europe
SVQ	*Scottish Vocational Qualification*, UK
TVET	technical and vocational education and training
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNESCO-UIS	UNESCO Institute for Statistics
UOE	UNESCO-UIS/OECD/EUROSTAT; jointly collect data on international education statistics every year (see e. g. UNESCO-UIS, OECD and EUROSTAT, 2008a,b,c)
VBO	*voorbereidend beroebsonderwijs*; 'pre-vocational education', NL
VHBO	*Voorbereidend Hoger Beroepsonderwijs*; 'preparation for higher vocational education', NL
VMBO	*voorbereidend middelbar beroebsonderwijs*; 'pre-vocational secondary education', NL
VWO	voorbereidend wetenschappelijk onderwijs; 'pre-university secondary education', NL
WVS	World Value Survey

COUNTRY CODES

AT	Austria
BE	Belgium
BG	Bulgaria
CH	Switzerland
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GB	Great Britain
GR	Greece
HU	Hungary
IE	Ireland
IL	Israel
IS	Iceland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
RU	Russian Federation
SE	Sweden
SI	Slovenia
SK	Slovakia
TR	Turkey
UA	Ukraine
UK	United Kingdom
US	United States