

Measurement of Education in EU-SILC – Preliminary Evaluation of Measurement Quality

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In EU-SILC education is measured along a simplified version of the ISCED 97-classification. The ISCED version used in the harmonized EU-SILC database distinguishes 6 levels of education. It neglects, however, any distinctions within levels of education according to the sub-dimensions programme orientation and programme destination, which are also available in the ISCED 97-classification (for details of the classification see UNESCO 2007 [1997], 1999; OECD 1999, Schneider/Kogan 2008). Roughly speaking, the former sub-dimension refers to the distinction between predominantly general/academic vs. predominantly vocational types of courses of study. This distinction has been shown to be quite crucial for a number of education related outcomes, such as for returns on the labour market, educational opportunities of children or various attitudinal or behavioural correlates of education. (Braun/Müller 1997; Schneider 2007,2008a,b; Müller/Klein 2008).

Neglecting the vocational/general distinction can lead to substantial heterogeneity within the aggregated levels of education in terms of the various correlates of education. Usually, therefore, the explanatory power of education (as measured e.g. by the variance explained) is considerably underestimated when vocational and general courses of study are not distinguished. Below, we will illustrate this phenomenon for one aspect of occupational outcomes.

In comparative research these issues lead to a further problems: The significance of the vocational / general distinction likely varies between countries, among others depending on

- the relative prevalence of either type of education,
- the differences in teaching contents, learning requirements (selectivity) and competence development in vocational in contrast to general courses of study;
- the role the distinction plays in structuring labour market and other opportunities of individuals in a given country;
- the prestige and reputation attached to different courses of study;
- the costs of respective courses of study.

Depending on such social and institutional differences in a nation's educational setup, the explanatory power of educational attainment is likely to be attenuated in different ways and to a different extent in different countries. Thus, cross-national comparisons based on the simplified ISCED used in EU-SILC (and other cross-national surveys) are likely to be seriously misleading. The comparability of both bivariate associations, education effects in multivariate models and even effects of other variables (because educational attainment is insufficiently controlled for) are dubious.

In this paper we give a brief account of some first explorations of several aspects of the quality of education measurement in EU-SILC. At this stage, we essentially concentrate on the distributions of respondents along the ISCED categories distinguished. We do not enter into the issue whether national educational categories have been coded properly, that is in accordance with the coding rules established in the definition of ISCED, into the international classification, since the EU-SILC does not allow such checks. Examining the distributions, however, may already give hints to problematic coding. In an attempt to evaluate the stability of educational coding in EU-SILC, we compare the educational distributions over successive survey years. To check consistency of measurement in different databases, we also compare the educational distribution in EU-SILC with the corresponding distribution found in EU-LFS for identical survey years and corresponding population definitions. Finally, we will turn to the issue of explanatory power of education as measured in EU-SILC. We thus consider the following points:

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1. The distribution of education along the ISCED 97 level categories
2. The stability of education measures over successive survey years in EU-SILC
3. Comparison of education measures in EU-SILC and EU-LFS
4. Explanatory power of education as measured in EU-SILC

In all of the following analyses we include only respondents aged 25-64. In the calculation of distributions, we apply the appropriate weights provided with the data.² In the regression analyses of explanatory power no weights are applied. Missing data for education is generally low, usually below 3%. Exceptions are Belgium with 5-8% missing data in the education variable, depending on survey year; France: 14-15%; Portugal: 6-8% and the UK: 8%.

1. Educational distributions in EU-SILC

Educational systems in Europe have become highly differentiated in recent decades. The number of educational pathways as well as the variety of educational diplomas has increased. How do the ISCED levels capture this feature of change in the provision of education? The international template for the classification of education in EU-SILC requires coding of the highest level of education attained into the following categories:

0	<i>Less than primary education</i>
1	<i>Primary education</i>
2	<i>Lower secondary education</i>
3	<i>Upper secondary education</i>
4	<i>Post-secondary non -tertiary education</i>
5	<i>First stage of tertiary education and Second stage of tertiary education (grouping of 5 and 6 ISCED levels)</i>
-1	<i>missing</i>
-2	<i>na (the person has never been in education)</i>

Today, there are no standardized procedures yet for National Statistical Institutes (NSIs) for collecting this information. Generally, countries use their own idiosyncratic procedures to collect educational information, which can already be expected to vary in terms of the quality of the output. Post-hoc harmonization into the above classification is then performed using the existing cross-walk tables from national educational programmes into the international ISCED categories. Eurostat provides no documentation on the detailed procedures applied in the various countries.³

² For EU-SILC, the weighting variable is “pb050” and for EU-LFS it is “coeff” (the quarterly weighting factor).

³ Eurostat provides the following additional information about procedures to be used (Eurostat 2009164):
 “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 basic unit of classification in ISCED-1997 is the educational programme. Educational programmes are defined “on the basis of their educational content as an array or sequence of educational activities, which are organised to accomplish a pre-determined objective or a specified set of educational tasks”. ISCED-1997 provides an improved set of criteria for assigning individual programmes to ‘levels’ of education. The more practical steps for the coding according to ISCED-97 will be found in the ISCED-97 manual published by UNESCO in November 1997.
 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” correspond to usual ISCED values 5 and 6.”

Table 1: ISCED distribution by survey year

		0	1	2	3	4	5			0	1	2	3	4	5	
		Row %	Row %	Row %	Row %	Row %	Row %			Row %	Row %	Row %	Row %	Row %	Row %	
AT	2004	0,0	6,7	18,7	47,9	11,0	15,9	LU	2003	0,0	28,5	9,9	36,2	2,5	22,9	
	2005	0,0	0,6	18,2	51,5	10,0	19,7		2004	0,0	26,9	9,8	36,8	2,5	23,9	
	2006	0,0	0,7	16,4	52,9	10,0	19,9		2005	0,0	25,9	9,9	36,6	2,4	25,1	
BE	2004	4,9	9,5	14,8	34,4	2,5	33,9	LV	2006	0,0	25,0	9,9	37,4	2,6	25,1	
	2005	1,0	9,3	15,4	33,8	2,7	37,9		2005	0,5	12,9	4,0	50,7	12,0	19,9	
	2006	0,5	8,9	14,7	34,0	3,1	38,8		2006	0,0	0,8	14,4	51,9	11,5	21,4	
CY	2005	2,7	17,3	10,3	37,0	2,7	30,0	NL	2005	0,0	6,1	21,4	37,8	3,4	31,4	
	2006	2,6	17,5	10,0	36,2	2,9	30,9		2006	0,3	5,2	21,0	36,9	3,6	33,0	
CZ	2005	0,0	0,3	9,4	75,1	1,8	13,5	NO	2003	0,3	0,2	11,3	55,4	3,3	29,7	
	2006	0,0	0,1	9,1	75,7	1,5	13,5		2004	0,2	0,1	10,5	56,6	3,0	29,7	
DE	2005	0,0	0,9	7,6	44,7	8,5	38,3		2005	0,1	0,1	10,0	55,5	2,9	31,4	
	2006	0,0	1,9	11,2	52,5	10,3	24,1		2006	0,1	0,1	21,4	42,8	3,1	32,6	
DK	2003	0,0	0,0	25,6	45,3	0,1	29,0		PL	2005	0,5	14,4	0,0	64,2	3,8	17,0
	2004	0,0	0,2	25,1	45,4	0,1	29,2	2006		0,5	14,1	0,0	64,6	4,0	16,8	
	2005	0,0	0,1	23,6	46,0	0,0	30,4	PT	2004	0,4	57,8	15,5	12,6	0,0	13,6	
	2006	0,0	0,1	23,1	46,2	0,0	30,6		2005	0,0	57,6	15,2	13,3	0,2	13,6	
EE	2004	0,3	1,1	10,4	48,8	9,0	30,5	2006	0,0	57,7	14,8	13,9	0,4	13,3		
	2005	0,3	0,9	10,1	47,9	10,5	30,3	SE	2004	0,0	6,3	10,0	49,1	6,3	28,3	
	2006	0,3	0,7	9,7	48,0	10,4	30,9		2005	0,0	6,1	9,4	47,8	6,2	30,4	
ES	2004	0,0	23,2	26,7	20,9	0,3	28,9		2006	0,0	5,6	8,9	46,7	6,4	32,4	
	2005	0,0	25,7	23,2	21,0	1,6	28,6	SI	2005	0,4	20,1	2,6	59,1	6,0	11,7	
	2006	0,0	26,5	21,6	20,7	1,5	29,7		2006	0,4	17,9	2,6	60,7	6,0	12,5	
FI	2004	0,0	13,3	8,3	45,0	0,0	33,4	SK	2005	0,0	0,1	8,0	75,2	0,0	16,8	
	2005	0,0	11,3	8,9	44,8	0,0	35,0		2006	0,0	0,4	6,5	75,4	0,0	17,7	
	2006	0,0	10,2	8,8	45,3	0,0	35,7	UK	2005	0,0	0,0	19,1	39,2	5,9	35,8	
FR	2004	0,0	9,2	8,9	49,9	1,7	30,3		2006	0,0	0,0	23,1	37,3	3,8	35,8	
	2005	0,0	8,8	8,4	49,5	1,8	31,5		GR	2003	0,0	30,8	11,5	30,5	4,9	22,3
	2006	0,0	8,1	8,5	49,8	1,9	31,6	2004		0,0	29,9	12,4	30,8	5,3	21,6	
GR	2005	0,0	29,4	11,9	31,2	5,7	21,8	2005		0,0	29,4	11,9	31,2	5,7	21,8	
	2006	0,0	29,2	11,7	32,0	5,9	21,3	2006		0,0	29,2	11,7	32,0	5,9	21,3	
	HU	2005	0,5	1,4	20,7	59,7	0,6	17,1	IE	2005	0,0	21,0	21,8	20,7	10,6	26,0
		2006	0,1	2,6	15,7	58,6	3,2	19,8		2006	0,0	20,8	21,1	20,1	9,8	28,1
IS	2004	0,0	1,2	30,4	35,7	8,6	24,1	IT	2004	2,5	15,9	33,4	33,0	4,5	10,7	
	2005	0,0	0,8	28,8	35,0	9,3	26,2		2005	2,1	15,0	32,9	33,5	4,6	11,9	
	2006	0,0	0,7	28,3	34,1	9,5	27,4		2006	1,0	13,6	30,7	34,5	8,0	12,2	
LT	2005	0,0	1,7	9,8	35,7	27,6	25,2	LU	2005	0,0	28,5	9,9	36,2	2,5	22,9	
	2006	0,0	1,5	9,9	35,9	27,8	24,9		2006	0,0	25,0	9,9	37,4	2,6	25,1	

Using this simplified classification, in most countries a large proportion of cases is classified into one single category, namely ISCED level 3 – upper secondary education (see table 1). An extreme concentration is found in the Czech Republic and in Slovakia, where three quarters of respondents are coded in ISCED level 3. In Portugal, in contrast, close to 60 % of respondents are coded in ISCED level 1⁴. Only Belgium, Cyprus, Spain, Greece, Ireland, Iceland, Italy, Lithuania, Luxembourg, the Netherlands and the UK have distributions with none of the categories counting 40% of the cases or more.

The high concentration of cases in ISCED level 3 is plausible, as in most countries in the course of educational expansion, most people attain at least a level 3 qualification. This is especially true of Eastern European countries. However, it is precisely at this level, that most countries offer clearly different courses of study that will produce a high degree of heterogeneity. In contrast to the large level 3 category sizes, in many countries category 4 tends to be very small. Applying the formal definition for ISCED category 4, this may correspond to reality, but it raises the question, whether it is sound to define a category that has little reality behind it in many countries. In many countries, also category 1 is very small, and in most of the countries category 0 is empty. The coding rules require that “ ‘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.” Given this requirement, the small proportion of people coded into ISCED 0 or 1 appears doubtful. For instance, it is well known for Germany, that the proportion of individuals who do neither accomplish certification at the lower secondary level nor at any higher level is clearly higher than the proportions found in table 1 for ISCED categories 0 or 1. Similar doubts can be raised for the Czech Republic, Denmark, Estonia, Hungary, Iceland, Lithuania, Norway, Slovakia and the UK. For instance, “Education at a Glance” classifies 14% of adults as primary education for the UK. It looks as if NSIs classify the mere completion in terms of full attendance of lower secondary (usually compulsory) education as successful completion of ISCED level 2, and disregard the actual achievement educational certificates. They thereby do not adhere to the (few) rules established by Eurostat, which possibly hints at an underlying lack of quality control or enforcement of established guidelines.

A consequence of the small cell sizes in category 0, 1, and 4 is that for analytic purposes a further step of aggregation will often be required. Essentially, this leads to a three level version of ISCED 97, with the educational groups 0-2 (low /lower secondary completed)/ 3-4 (medium /upper secondary completed)/ 5-6 (high/tertiary education completed), which is very often found in international education statistics.

2. Classification consistency over time

The availability of EU-SILC for three consecutive years in most of the countries allows exploring the stability of the observed educational distributions over time. As EU-SILC is a panel study, essentially interviewing the same individuals in successive waves, there should be only little difference in the population covered from wave to wave. As we include only individuals aged 25-64, only few people should be expected to actually change their educational level. Therefore we should expect little change in the educational distributions over consecutive years. Stability or change of distributions over waves can be traced in table 1. For the countries with more than little change, table 2 summarizes the most important changes in the distributions.

In the majority of countries, the expectation on highly similar distributions is confirmed. At least on the aggregate level distributions are rather similar over time. In a number of countries, however, we observe more change than what we should expect if the same measurement and coding procedures were used in

⁴ Since there is not much differentiation within countries within primary education, this is however not much of a problem: Large categories become a problem only in differentiated education levels.

each wave. The EU-SILC documentation does not give any information on breaks in series due to changes of measurement and coding procedures at the country level. For most cases the patterns of changes seem to indicate that they result from allocating differently some national courses of study to the ISCED classification. In most cases, such recoding seems to move people from a lower level category upwards into a higher level category, but there are also downward changes and changes between non adjacent categories.

Table 2: Changes in ISCED distributions over survey years in EU-SILC (countries selected with a change of 3 or more percentage points in a single category).

	Declining category	Increasing category	Direction of move	Largest shift in a single category in percentage points
AT	1	3 and 5	Up	6
BE	0	5	Up	4
DE	5	2,3	Down	16
ES	2	1	Down	5
FI	1	5	Up	3
HU	2	4 and 5	Up	5
IT	1,2	4	Up	3
LV	1	2	Up	12
NO	3	2	Down	12
SE	2,3	5	Up	4
UK	3,4	2	Down	4

3. Comparing educational distributions in EU-SILC with EU-LFS

A further option to evaluate educational coding in EU-SILC is to compare EU-SILC educational distributions with the corresponding distributions in EU-LFS. Both data sets are collected by NSIs from similar population samples. EU-LFS is a database established for long and has been evaluated intensively by Schneider (2008). With a few exceptions, EU-LFS educational distributions were found to correspond relatively closely to educational distributions from national databases. Also because EU-LFS is usually based on larger samples than EU-SILC it may be taken as a reference. Finally, in many countries, the LFS makes finer distinctions within some ISCED level categories, notably for ISCED levels 3 and level 5. It therefore shows where the problem of large category size could be reduced by applying LFS coding routines.

For the observation year 2005, detailed results of these comparisons can be found in Appendix Table A1. They are summarized in table 3, which shows the most important differences in the distributions and the index of dissimilarity between the two distributions as a summary measure of the discrepancies observed between the distributions. Countries differ very much in the extent of deviations between LFS and SILC distributions. The index of dissimilarity shows, that only in a few countries the two distributions correspond closely to each other (CZ, SE, FI, NL,LT). In 9 of 26 countries we find huge discrepancies in the educational distributions of both datasets, the index of dissimilarity amounting to 10 or more. Such large differences can hardly result from differences in survey sampling; they rather must result from a different assignment in the two surveys of particular national education categories into ISCED categories. But across countries, there is no regularity in the pattern of discrepancies. In some countries, cases with a lower level LFS-assignment have a higher level SILC assignment; in other countries the reverse is true. Sometimes we find complementary differences in adjacent categories. But this does not explain all differences. There are also complementary differences in distant categories. All this leads to the conclusion that there must be quite marked differences in data collection and coding procedures within countries for different surveys even if the data are in both cases processed by the

Table 3: Differences in educational distributions in EU-SILC and EU-LFS

	Categories smaller in SILC than in LFS	Categories larger in SILC than in LFS	Direction of change from LFS to SILC	Index of dissimilarity	Substantial disaggregation at level 3 in LFS
CZ				0,7	Y
SE				1,1	N
FI				1,2	N
NL				2,1	Y
LT				2,6	Y
EE	5	4	down	3,0	(Y)
NO	(2,5)	3		3,1	N
HU	(2,4)	3		3,2	Y
IT	3	4	up	3,8	Y
SK	2	5	up	4,3	Y
CY	1,2	3,5	up	4,7	N
GR	4	3	down	5,0	N
ES	2	1	down	5,0	(Y)
AT	2	(3,4) 5	Up	5,2	N
DK	3,5	2	down	6,0	(Y)
PT	0	1	up	6,4	N
IE	3,5	1,2	down	7,8	N
BE	1,2	5	Up	9,9	Y
IS	2,5	3,4		11,7	Y
UK	2,3	4,5	up	12,1	Y
LU	0,2	1		13,9	Y
LV	2,4	1	down	13,9	N
PL	2	1	down	15,3	Y
DE	1,2,3	5	up	15,6	N
FR	1,2	3,5	up	16,4	Y
SI	2,5	1,4	down	24,2	N

statistical offices. At least for countries with large discrepancies, the two different surveys tell rather different stories about the educational reality.

With respect to large categories in EU-SILC, the more detailed EU-LFS coding shows that in a number of countries the large categories would disappear if sub-categories 3AB vs. 3C were differentiated within level 3 (CZ, FR, HU, PL, SK). However in other cases also the EU-LFS is too aggregated or does not make the 'most useful' distinction (3AB vs. 3C rather than 3A vs. 3B vs. 3C or voc vs. gen, see e.g. AT, DE, DK, EE, FI, LV, NO, SE, SI).

In many countries also ISCED level 5 (including ISCED level 6, as defined in SILC) has become a large category. In the LFS, practically all countries distinguish between levels 5A, 5B and 6 (PhD). When differentiated, 5B is usually smaller than 5A.

4. Education as predictor of occupational outcomes (ISEI) – Comparisons between EU-SILC and ESS

The final validation aspect of education measurement in EU-SILC we address concerns criterion validity: As criterion we select the occupation individuals currently hold. How well does education predict occupational outcomes? However measured occupational outcomes usually are among the strongest correlates of education. For reasons of simplicity of presentation we measure occupational outcomes by ISEI scores (Ganzeboom 2005). We consider several aspects?

- a) How stable are these criterion correlations for EU-SILC from wave to wave?
- b) How do the criterion correlations in EU-SILC compare with the corresponding criterion correlations in ESS, when identically defined ISCED coding is used in ESS as in SILC? That is, we compare the SILC_ISCED-ISEI correlation with the ESS_ISCED-ISEI correlation.
- c) Besides the ISCED measure, ESS also provides a Country Specific Education Variable (CSEV); that is education is coded into a set of national education categories that are considered best practice for education measurement in each singly country. This give us the opportunity to compare the ESS_CSEV-ISEI correlations with the ESS_ISCED-ISEI correlations and to examine – for the chosen criterion – the loss of explanatory power of education when instead of using the best national standard as education measure we code education according to the ISCED levels applied in EU-SILC. By analogy, this can be taken as a proxy estimate of the loss likely generated for the explanatory power of education in SILC when coding education according to the ISCED-level measure instead of using an education measure more differentiated and more appropriate to the national case.

Depending on the country, up to four waves of EU-SILC can be used to calculate Education-ISEI correlations. The number of waves for which data is available in each country is shown in column 2 of table 4. Results are given in terms of explained variance in LS regression equations, regressing ISEI scores on education dummies – constructed from the single categories of the education measure – and in addition controlling for gender and age. The figures for variance explained in each wave can be seen from Appendix table A2. In columns 3 and 4 of table 3, we show N and variance explained when using a sample out of all observations that includes the instance in which the respondent was observed in EU-SILC for the first time. In column 5, in contrast, we indicate how variance explained varies from wave to wave, showing the difference of the coefficient between the wave with the largest and the wave with the smallest coefficient.

The correlations differ strongly from country to country, from 21% variance explained in the UK to 55 % in Slovenia. In the majority of countries, the coefficients vary little from wave to wave, as they should. In 18 out of 26 countries the maximum difference across waves is below 2 percentage points of variance explained. But in about one third of the countries (in BE, DK, EE, HU, IS, LU, SK) the coefficients differ more from wave to wave. At large, thus, we find considerable stability between waves, but further explorations are needed to understand the reasons for the large variation in some of the countries.

As to the size of the coefficients found for the various countries: Some are consistent with what is known from earlier research, others are not. For example: UK is know as a country with low education-ISEI association. EU-SILC is consistent with this expectation. Countries in Eastern Europe tend to have strong association between education and occupational status (Kogan/Schubert 2003). With the clear exception of Estonia, this is found for most of these countries, in EU-SILC. But one would also expect somewhat higher coefficients for Czech lands and Slovakia. Another set of countries for which one should expect large coefficients are the countries with a well developed vocational training system such as Austria, Germany, Denmark, Luxemburg and the Netherlands (Müller/Shavit 1998). In EU-SILC this comes out only for Luxemburg, and perhaps the

Table 4: Comparing variance explained of current ISEI occupational status by education in EU-SILC and ESS, using ISCED and Country Specific Education Variables (CSEV).

country	# of waves	EU-SILC (ISCED 6)			ESS (ISCED 6)		ESS (CSEV)		Difference in R ² between ESS_ISCED and ESS_CSEV		Proportion R ²
		N	adj. R ²	Max difference across waves	N	adj. R ²	# ccat / adj. R ²	SILC_ISCED	ESS_ISCED	$\frac{ESS_ISCED}{ESS_CSEV}$	
AT	3	5300	26,9	0,7	.	.	6 / 37,0				
BE	3	4181	34,9	3,9	3336	40,2	11 / 43,2	5,3	3,0	0,93	
CY	2	3420	45,4	0,7	624	46,7	6 / 53,7	1,3	7,0	0,87	
CZ	2	4175	35,2	0,7	2576	37,9	11 / 53,8	2,7	15,9	0,70	
DE	2	8613	23,6	0,6	5513	29,9	20 / 46,1	6,3	16,2	0,65	
DK	4	5364	26,5	3,8	2036	31,6	10 / 40,2	5,1	8,6	0,79	
EE	3	5157	28,4	3,2	2070	30,3	13 / 36,2	1,9	5,9	0,84	
ES	3	11792	40,1	1,6	900	53,0	14 / 54,1	12,9	1,2	0,98	
FI	3	6442	34	1,4	3786	36,6	7 / 37,8	2,6	1,2	0,97	
FR	3	9536	34,8	1,2	1368	35,8	12 / 46,1	1,0	10,3	0,78	
GR	4	4696	51,7	1,9	2539	48,9	7 / 53,2	-2,4	4,3	0,92	
HU	3	5176	48,9	4,2	1926	48,3	14 / 58,8	-0,6	10,5	0,82	
IE	3	3631	31,3	0,7	.	.	7 / 40,2	.	.	.	
IS	3	2401	34,8	5,1	333	21,7	6 / 31,9	-13,1	10,2	0,68	
IT	3	17666	32	1,2	821	42,5	8 / 44,1	10,5	1,6	0,96	
LT	2	3471	38,8	1,4	.	.	.				
LU	4	5204	50,3	6,6	1889	40,7	18 / 48,4	-9,6	7,7	0,84	
LV	2	3410	37,1	4,2	.	.	.				
NL	3	8287	37,1	0,8	4279	32,7	13 / 34,9	-4,4	2,2	0,94	
NO	4	4014	25,9	1,8	3721	29	8 / 32,8	3,1	3,8	0,89	
PL	3	11047	48,1	0,7	1275	43,4	10 / 56,2	-4,7	12,8	0,77	
PT	3	3990	48,6	3	1261	57,2	10 / 59,3	8,6	2,1	0,96	
SE	3	5849	36	0,6	2624	36,4	12 / 44,3	0,4	7,9	0,82	
SI	3	10417	55,4	0,6	2509	40,2	7 / 49,9	-15,2	9,7	0,82	
SK	2	4762	35,5	2,8	1926	37,3	8 / 45,5	1,8	8,2	0,82	
UK	2	7444	20,7	0,3	2827	23,1	7 / 30,5	2,4	7,4	0,76	
Mean		6363,3	37,0		2279,2	38,4	44,9	1,36	6,57	0,85	
s.dev.			9,3			9,1	8,3				
Min		2401,0	20,7		333,0	21,7	30,5				
25 percentile		4054,3	31,5		1298,3	31,9	37,6				
median		5190,0	35,4		2053,0	37,6	44,9				
75 percentile		8076,3	55,4		2776,3	57,2	59,3				
Max		17666,0	55,4		5513,0	57,2	59,3				

Netherlands. Austria, Germany and Denmark, in contrast, are among the countries with the very lowest education-ISEI-association, a result that goes against all established knowledge.

How do the results in EU-SILC compare to those found for corresponding variable definitions in the ESS? Respective ESS-results (calculated from data of all ESS-rounds available for the various countries) are given in columns 6 and 7 of table 3, and column 9 shows the difference between ESS

and EU-SILC. On average, variance explained in the ESS-data is slightly larger than in EU-SILC (38,4% vs. 37,9%). However, in some of the countries, results differ strongly between the two data sources. In 9 out of 22 countries (BE, DE, DK, ES, IS, IT, LU, PT, SI), variance explained differs more than 5 percentage points, in the countries underlined even 10 percentage points or more. Evidently, reasons for deviations can reside in either data source, and further research is needed to allow conclusions.

Finally, in columns 8 we see variance explained when education is coded along all country specific educational categories available in ESS. As indicated the number of such categories available in particular countries differs, and no attempt is made in this paper to harmonize these categories into a internationally comparable classification (but see Schneider 2008 for this). Using the national categories instead of the ISCED 6 increases variance explained in all countries. The increase, however, varies by country. In 14 out of 22 countries variance explained increases by more than 5 percentage points, and in 6 countries by more than 10 percentage points. The increase is particularly marked in Germany, Czech lands, France, Hungary, Island and Poland. Interestingly, the differences between countries in variance explained have slightly declined (the standard deviation of the measure over countries declines from 9.1. to 8.3), but the differences between countries still remain large, varying from 30,5 % of variance explained in the UK (again) to 59,2 % in Portugal. The countries with the extended vocational training systems have all advanced considerably, making their position in the range of countries more plausible than in the case of the ISCED measure with six levels only.

What is the increase in variance explained related to? We have explored two possible explanations. First, variance explained may increase with the number of educational categories used to predict occupational outcomes. Indeed the increase in variance explained is weakly correlated with the number of country specific educational categories available. The correlation is 0.245. But even more than to the pure number of educational categories, the increase should be related to making distinctions where otherwise large heterogeneity in terms of outcomes remains within categories. To catch this aspect we have correlated the increase in variance explained with the size of the ISCED category 3 which we assume to be highly heterogeneous in many countries if no further differentiations are made. This correlation is 0.628. We thus believe that a large part of the increase in variance explained achieved with the nation specific coding of education derives from more adequate distinctions being made at the upper secondary level of education. Other improvements are likely to result from finer distinctions at the tertiary level of education.

5. Conclusions

Table 5 gives a summary of some of the various quality problems in education measurement observed in the various sections of this paper. These include:

As a consequence of using the simplified “only levels version” of the ISCED classification the resulting measurement of education comes out as a very rough classification with large proportions of the population coded into large highly heterogeneous categories. This is particularly true for ISCED level 3, but with increasing significance among the younger cohorts also for ISCED level 5. But even in countries, in which educational attainment is more evenly distributed among the various levels distinguished by ISCED, the lack of differentiation within heterogeneous categories can damage measurement quality.

In a number of countries we find high measurement instability from wave to wave drawing into doubt the interwave reliability of the measures. Even larger discrepancies in education distributions result from EU-SILC and EU-LFS in spite of the fact that both databases are produced by the same NSIs. IN some of the countries, dissimilarities between the two sources are huge.

Also in terms of criterion validity EU-SILC needs improvement. In a few countries, the correlations between ISCED and ISEI vary considerably between waves. Partly, there are also large differences in

Table 5: Summary of quality problems in education measurement in European countries.*

	ISCED 3 >40% / split in LFS	SILC Wave diff. >3%	SILC LFS dissim >10%	Diff. ^d ESS- SILC >3%	Diff. ^d CSEV- ISCED > 3%		ISCED 3 >40% / split in LFS	SILC Wave diff. >3%	LFS dissim >10%	Diff. ^d ESS- SILC > 3%	Diff. ^d CSEV- ISCED > 3%
AT	Y	Y		?	?	IS	/ Y		Y	- y ^c	Y
BE	/ Y ^a	Y	Y	Y	Y	IT	/ Y	Y		Y	
CY					Y	LT				.	.
CZ	Y / Y				Y	LU	/ Y	Y	Y	- y	Y
DE	Y	Y	Y	Y	Y	LV	Y		Y	.	.
DK	Y / (Y)			Y	Y	NL				Y	
EE	Y / (Y)				Y	NO	Y	Y		y	Y
ES		Y		Y		PL	Y		y	- y	Y
FI	Y	(Y) ^b				PT				Y	
FR	Y		Y		Y	SE	Y	(Y)			Y
GR					Y	SI	Y		Y	- y	Y
HU	Y / Y				Y	SK					Y
IE				.	.	UK	Y / Y		Y		Y

* "Y" indicates that issue mentioned in column head exists in given country

^a „/ Y“: LFS provides further differentiation at ISCED level 3; „/ (Y)“: LFS provides further differentiation at ISCED level 3, but cases remain highly concentrated in one category.

^b “()” indicate linear trend from wave to wave.

^c “-“ indicates that variance explained is smaller in ESS than EU-SILC

^d Difference in explained variance between ..

the size of the criterion correlation between EU-SILC and ESS, when in both data the same ISCED classification is used. Evidently, the latter differences can also be due to particular features of ESS. However, the correlations with the country specific measures for education in ESS unmistakably support the view that EU-SILC tends to underestimate the role of educational attainment for occupational attainment. This seems to be the case for all countries, yet to a different extent. Needless to say, the varying loss of explanatory power for education when collapsing national educational categories to the ISCED level classification can partly also derive from inadequate differentiation in the CSEV available for the different countries.

The results we have presented here are preliminary in various respects. But they are useful to direct the search for further clarification and the design of additional analyses. To clarify various irregularities

found in the data one option is to search for information at the national level, both among NSI's and PIs in ESS.

In terms of further analyses, several strategies could be pursued. The examination of criterion validity could be extended to include other outcomes of education such as unemployment risks, labor force participation, class position or income. Analyses done here with ESS and SILC should be compared with similar analyses done by the EQUALSOC EDUC team validating educational measurement in the EU-LFS. As at least for some of the countries, the LFS provides more detailed measures, the relevance of particular distinctions for the explanatory power of education could be explored.

As to internationally comparative studies concerning substantive issues related to education, the results found here do not suggest promoting at this stage EU-SILC as a promising data base. One of the first crucial steps to improve the situation would be to release to the research community better data documentation and the original national measures from which the internationally "harmonized" variables have been derived. From this one might be able to construct more adequate measures for European comparative research than so far available.

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Appendix

Table A1: Comparing EU-LFS with EU-SILC in ISCED-coding and -distributions

EU-LFS ISCED categories	EU-SILC ISCED categories	EU-LFS %	EU-LFS % coded like EU-SILC	EU-SILC %	diff EU-LFS/EU-SILC	absolute deviations
AT						
No formal or below ISCED 1	ISCED 0	0,0	0,0	0,0	0,0	0,0
ISCED 1	ISCED 1	0,0	0,0	0,6	-0,6	0,6
ISCED 2	ISCED 2	20,0	23,4	18,2	5,2	5,2
ISCED 3C (shorter than 3 years)		3,4				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	50,5	51,5	-1,0	1,0
ISCED 3C (3 years and more)		0,0				
ISCED 3 A/B		50,5				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	8,5	8,5	10,0	-1,5	1,5
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	8,8	17,6	19,7	-2,1	2,1
ISCED 5A		8,5				
ISCED 6		0,4				
		100,0	100,0	100,00		10,4
BE						
No formal or below ISCED 1	ISCED 0	5,7	5,7	1,0	4,7	4,7
ISCED 1	ISCED 1	9,8	9,8	9,3	0,5	0,5
ISCED 2	ISCED 2	19,1	19,1	15,4	3,7	3,7
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	32,7	33,8	-1,0	1,0
ISCED 3C (3 years and more)		8,7				
ISCED 3 A/B		24,0				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	2,0	2,7	-0,7	0,7
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		2,0				
ISCED 5B	ISCED 5/6	17,1	30,7	37,9	-7,2	7,2
ISCED 5A		13,2				
ISCED 6		0,5				
		100,0	100,0	100,00		17,8
CY						
No formal or below ISCED 1	ISCED 0	2,9	2,9	2,7	0,2	0,2
ISCED 1	ISCED 1	19,4	19,4	17,3	2,1	2,1
ISCED 2	ISCED 2	11,5	12,4	10,3	2,1	2,1
ISCED 3C (shorter than 3 years)		0,9				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	34,6	37,0	-2,4	2,4
ISCED 3C (3 years and more)		0,0				
ISCED 3 A/B		34,6				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	3,0	2,7	0,3	0,3
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		3,0				
ISCED 5B	ISCED 5/6	10,5	27,8	30,0	-2,2	2,2
ISCED 5A		16,9				
ISCED 6		0,4				
		100,0	100,0	100,00		9,3

EU-LFS ISCED categories	EU-SILC ISCED categories	EU-LFS %	EU-LFS % coded like EU-SILC	EU-SILC %	diff EU- LFS/EU- SILC	absolute deviations
CZ						
No formal or below ISCED 1	ISCED 0	0,1	0,1	0,0	0,1	0,1
ISCED 1	ISCED 1	0,1	0,1	0,3	-0,2	0,2
ISCED 2	ISCED 2	9,9	9,9	9,4	0,6	0,6
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	75,0	75,1	0,0	0,0
ISCED 3C (3 years and more)		42,4				
ISCED 3 A/B		32,6				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	1,7	1,8	-0,1	0,1
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		1,7				
ISCED 5B	ISCED 5/6	0,6	13,1	13,5	-0,4	0,4
ISCED 5A		11,9				
ISCED 6		0,6				
		100,0	100,0	100,00		1,3
DE						
No formal or below ISCED 1	ISCED 0	0,0	0,0	0,0	0,0	0,0
ISCED 1	ISCED 1	3,2	3,2	0,9	2,3	2,3
ISCED 2	ISCED 2	13,7	13,7	7,6	6,1	6,1
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	51,9	44,7	7,2	7,2
ISCED 3C (3 years and more)		0,0				
ISCED 3 A/B		51,9				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	6,6	6,6	8,5	-1,9	1,9
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	9,6	24,6	38,3	-13,6	13,6
ISCED 5A		13,9				
ISCED 6		1,2				
		100,0	100,0	100,00		31,2
DK						
No formal or below ISCED 1	ISCED 0	1,1	1,1	0,0	1,1	1,1
ISCED 1	ISCED 1	0,2	0,2	0,1	0,2	0,2
ISCED 2	ISCED 2	16,0	17,6	23,6	-6,0	6,0
ISCED 3C (shorter than 3 years)		1,5				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	48,1	46,0	2,1	2,1
ISCED 3C (3 years and more)		44,3				
ISCED 3 A/B		3,8				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	0,0	0,0	0,0	0,0
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	7,2	32,9	30,4	2,6	2,6
ISCED 5A		25,3				
ISCED 6		0,4				
		100,0	100,0	100,00		12,0

EU-LFS ISCED categories	EU-SILC ISCED categories	EU-LFS %	EU-LFS % coded like EU-SILC	EU-SILC %	diff EU- LFS/EU- SILC	absolute deviations
EE						
No formal or below ISCED 1	ISCED 0	0,4	0,4	0,3	0,1	0,1
ISCED 1	ISCED 1	0,3	0,3	0,9	-0,6	0,6
ISCED 2	ISCED 2	10,4	10,4	10,1	0,4	0,4
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	48,2	47,9	0,3	0,3
ISCED 3C (3 years and more)		6,9				
ISCED 3 A/B		41,3				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	7,1	7,1	10,5	-3,4	3,4
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	11,4	33,5	30,295	3,2	3,2
ISCED 5A		21,6				
ISCED 6		0,5				
		100,0	100,0	100,00		8,0
ES						
No formal or below ISCED 1	ISCED 0	1,0	1,0	0,0	1,0	1,0
ISCED 1	ISCED 1	23,5	23,5	25,7	-2,2	2,2
ISCED 2	ISCED 2	26,8	27,1	23,2	4,0	4,0
ISCED 3C (shorter than 3 years)		0,3				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	20,1	21,0	-0,9	0,9
ISCED 3C (3 years and more)		0,1				
ISCED 3 A/B		20,0				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	0,1	1,602	-1,5	1,5
ISCED 4C		0,1				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	8,2	28,2	28,6	-0,3	0,3
ISCED 5A		19,5				
ISCED 6		0,6				
		100,0	100,0	100,00		10,0
FI						
No formal or below ISCED 1	ISCED 0	0,0	0,0	0,0	0,0	0,0
ISCED 1	ISCED 1	11,1	11,1	11,3	-0,1	0,1
ISCED 2	ISCED 2	9,8	9,8	8,9	0,9	0,9
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	44,3	44,8	-0,6	0,6
ISCED 3C (3 years and more)		0,0				
ISCED 3 A/B		44,3				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	0,3	0	0,3	0,3
ISCED 4C		0,3				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	16,6	34,5	35,0	-0,5	0,5
ISCED 5A		17,1				
ISCED 6		0,8				
		100,0	100,0	100,00		2,4

EU-LFS ISCED categories	EU-SILC ISCED categories	EU-LFS %	EU-LFS % coded like EU-SILC	EU-SILC %	diff EU- LFS/EU- SILC	absolute deviations
FR						
No formal or below ISCED 1	ISCED 0	1,1	1,1	0,0	1,1	1,1
ISCED 1	ISCED 1	13,3	13,3	8,8	4,5	4,5
ISCED 2	ISCED 2	19,2	19,2	8,4	10,8	10,8
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	41,7	49,5	-7,8	7,8
ISCED 3C (3 years and more)		28,9				
ISCED 3 A/B		12,8				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	0,1	1,8	-1,7	1,7
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,1				
ISCED 5B	ISCED 5/6	9,8	24,6	31,5	-6,9	6,9
ISCED 5A		14,2				
ISCED 6		0,6				
		100,0	100,0	100,00		32,8
GR						
No formal or below ISCED 1	ISCED 0	0,8	0,8	0,0	0,8	0,8
ISCED 1	ISCED 1	28,6	28,6	29,4	-0,8	0,8
ISCED 2	ISCED 2	10,9	13,5	11,9	1,6	1,6
ISCED 3C (shorter than 3 years)		2,5				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	28,4	31,2	-2,8	2,8
ISCED 3C (3 years and more)		0,2				
ISCED 3 A/B		28,2				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	8,2	5,7	2,6	2,6
ISCED 4C		8,2				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	6,1	20,5	21,8	-1,4	1,4
ISCED 5A		14,1				
ISCED 6		0,4				
		100,0	100,0	100,00		9,9
HU						
No formal or below ISCED 1	ISCED 0	0,0	0,0	0,5	-0,5	0,5
ISCED 1	ISCED 1	1,9	1,9	1,4	0,4	0,4
ISCED 2	ISCED 2	22,1	22,1	20,7	1,4	1,4
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	57,2	59,7	-2,5	2,5
ISCED 3C (3 years and more)		29,3				
ISCED 3 A/B		27,8				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	1,9	1,9	0,6	1,3	1,3
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	0,2	17,0	17,102	-0,1	0,1
ISCED 5A		16,5				
ISCED 6		0,3				
		100,0	100,0	100,00		6,3

EU-LFS ISCED categories	EU-SILC ISCED categories	EU-LFS %	EU-LFS % coded like EU-SILC	EU-SILC %	diff EU- LFS/EU- SILC	absolute deviations
IE						
No formal or below ISCED 1	ISCED 0	0,5	0,5	0,0	0,5	0,5
ISCED 1	ISCED 1	16,7	16,7	21,0	-4,3	4,3
ISCED 2	ISCED 2	18,1	18,2	21,8	-3,6	3,6
ISCED 3C (shorter than 3 years)		0,1				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	24,6	20,7	4,0	4,0
ISCED 3C (3 years and more)		0,0				
ISCED 3 A/B		24,6				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	10,9	10,6	0,3	0,3
ISCED 4C		10,9				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	10,7	29,0	26,0	3,0	3,0
ISCED 5A		17,9				
ISCED 6		0,5				
		100,0	100,0	100,00		15,7
IS						
No formal or below ISCED 1	ISCED 0	0,0	0,0	0,0	0,0	0,0
ISCED 1	ISCED 1	2,2	2,2	0,8	1,4	1,4
ISCED 2	ISCED 2	27,7	34,3	28,8	5,5	5,5
ISCED 3C (shorter than 3 years)		6,6				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	30,4	35,0	-4,6	4,6
ISCED 3C (3 years and more)		21,8				
ISCED 3 A/B		8,5				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	2,1	9,3	-7,2	7,2
ISCED 4C		2,1				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	4,6	31,0	26,2	4,8	4,8
ISCED 5A		26,5				
ISCED 6		0,0				
		100,0	100,0	100,00		23,4
IT						
No formal or below ISCED 1	ISCED 0	2,4	2,4	2,1	0,3	0,3
ISCED 1	ISCED 1	15,3	15,3	15,0	0,4	0,4
ISCED 2	ISCED 2	32,0	32,6	32,9	-0,3	0,3
ISCED 3C (shorter than 3 years)		0,6				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	36,7	33,5	3,2	3,2
ISCED 3C (3 years and more)		7,3				
ISCED 3 A/B		29,4				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	1,1	4,6	-3,5	3,5
ISCED 4C		1,1				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	0,5	11,9	11,9	0,0	0,0
ISCED 5A		11,3				
ISCED 6		0,1				
		100,0	100,0	100,00		7,7

EU-LFS ISCED categories	EU-SILC ISCED categories	EU-LFS %	EU-LFS % coded like EU-SILC	EU-SILC %	diff EU- LFS/EU- SILC	absolute deviations
LT						
No formal or below ISCED 1	ISCED 0	0,5	0,5	0,0	0,5	0,5
ISCED 1	ISCED 1	1,7	1,7	1,7	0,0	0,0
ISCED 2	ISCED 2	10,7	10,7	9,8	1,0	1,0
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	34,9	35,7	-0,8	0,8
ISCED 3C (3 years and more)		3,5				
ISCED 3 A/B		31,4				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	25,8	25,8	27,6	-1,9	1,9
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	6,8	26,5	25,2	1,2	1,2
ISCED 5A		19,5				
ISCED 6		0,2				
		100,0	100,0	100,00		5,3
LU						
No formal or below ISCED 1	ISCED 0	5,8	5,8	0,0	5,8	5,8
ISCED 1	ISCED 1	13,1	13,1	25,9	-12,8	12,8
ISCED 2	ISCED 2	9,5	15,3	9,9	5,4	5,4
ISCED 3C (shorter than 3 years)		5,9				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	35,5	36,6	-1,2	1,2
ISCED 3C (3 years and more)		17,5				
ISCED 3 A/B		17,9				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	3,8	2,4	1,4	1,4
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		3,8				
ISCED 5B	ISCED 5/6	9,6	26,6	25,1	1,4	1,4
ISCED 5A		15,8				
ISCED 6		1,2				
		100,0	100,0	100,00		27,9
LV						
No formal or below ISCED 1	ISCED 0	0,4	0,4	0,5	-0,1	0,1
ISCED 1	ISCED 1	1,0	1,0	12,9	-11,9	11,9
ISCED 2	ISCED 2	15,0	15,0	4,0	11,0	11,0
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	52,1	50,7	1,3	1,3
ISCED 3C (3 years and more)		4,1				
ISCED 3 A/B		48,0				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	10,1	10,1	12,0	-2,0	2,0
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	2,1	21,5	19,901	1,6	1,6
ISCED 5A		19,1				
ISCED 6		0,3				
		100,0	100,0	100,00		27,9

EU-LFS ISCED categories	EU-SILC ISCED categories	EU-LFS %	EU-LFS % coded like EU-SILC	EU-SILC %	diff EU- LFS/EU- SILC	absolute deviations
NL						
No formal or below ISCED 1	ISCED 0	1,0	1,0	0,0	1,0	1,0
ISCED 1	ISCED 1	6,5	6,5	6,1	0,5	0,5
ISCED 2	ISCED 2	20,7	20,7	21,4	-0,7	0,7
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	38,3	37,8	0,6	0,6
ISCED 3C (3 years and more)		15,2				
ISCED 3 A/B		23,2				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	3,1	3,4	-0,2	0,2
ISCED 4C		3,1				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	1,8	30,3	31,401	-1,1	1,1
ISCED 5A		27,8				
ISCED 6		0,7				
		100,0	100,0	100,00		4,2
NO						
No formal or below ISCED 1	ISCED 0	0,3	0,3	0,1	0,2	0,2
ISCED 1	ISCED 1	0,2	0,2	0,1	0,1	0,1
ISCED 2	ISCED 2	11,1	11,1	10,0	1,1	1,1
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	52,4	52,4	55,5	-3,1	3,1
ISCED 3C (3 years and more)		0,0				
ISCED 3 A/B		0,0				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	3,4	2,9	0,5	0,5
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		3,4				
ISCED 5B	ISCED 5/6	0,0	32,7	31,4	1,3	1,3
ISCED 5A		32,2				
ISCED 6		0,5				
		100,0	100,0	100,00		6,2
PL						
No formal or below ISCED 1	ISCED 0	0,3	0,3	0,5	-0,2	0,2
ISCED 1	ISCED 1	0,1	0,1	14,4	-14,4	14,4
ISCED 2	ISCED 2	15,0	15,0	0,0	15,0	15,0
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	64,4	64,2	0,2	0,2
ISCED 3C (3 years and more)		34,0				
ISCED 3 A/B		30,5				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	3,7	3,8	-0,1	0,1
ISCED 4C		3,7				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	0,0	16,5	17,0	-0,5	0,5
ISCED 5A		16,2				
ISCED 6		0,3				
		100,0	100,0	100,00		30,5

EU-LFS ISCED categories	EU-SILC ISCED categories	EU-LFS %	EU-LFS % coded like EU-SILC	EU-SILC %	diff EU- LFS/EU- SILC	absolute deviations
PT						
No formal or below ISCED 1	ISCED 0	6,0	6,0	0,0	6,0	6,0
ISCED 1	ISCED 1	53,1	53,1	57,6	-4,6	4,6
ISCED 2	ISCED 2	14,7	14,7	15,2	-0,6	0,6
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	13,0	13,0	13,3	-0,3	0,3
ISCED 3C (3 years and more)		0,0				
ISCED 3 A/B		0,0				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	0,6	0,2	0,3	0,3
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,6				
ISCED 5B	ISCED 5/6	2,5	12,7	13,6	-0,9	0,9
ISCED 5A		9,5				
ISCED 6		0,7				
		100,0	100,0	100,00		12,7
SE						
No formal or below ISCED 1	ISCED 0	0,0	0,0	0,0	0,0	0,0
ISCED 1	ISCED 1	6,6	6,6	6,1	0,4	0,4
ISCED 2	ISCED 2	10,0	10,0	9,4	0,6	0,6
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	47,9	47,9	47,8	0,1	0,1
ISCED 3C (3 years and more)		0,0				
ISCED 3 A/B		0,0				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	6,1	6,2	-0,1	0,1
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		6,1				
ISCED 5B	ISCED 5/6	9,0	29,5	30,4	-0,9	0,9
ISCED 5A		19,4				
ISCED 6		1,0				
		100,0	100,0	100,00		2,1
SI						
No formal or below ISCED 1	ISCED 0	0,3	0,3	0,4	-0,1	0,1
ISCED 1	ISCED 1	2,0	2,0	20,1	-18,1	18,1
ISCED 2	ISCED 2	17,1	17,1	2,6	14,6	14,6
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	60,5	59,1	1,3	1,3
ISCED 3C (3 years and more)		0,0				
ISCED 3 A/B		0,0				
ISCED 3 or 4 (no further distinction possible)		60,5				
ISCED 4A/B	ISCED 4	0,0	0,0	6,0	-6,0	6,0
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	9,7	20,0	11,7	8,3	8,3
ISCED 5A		9,0				
ISCED 6		1,4				
		100,0	100,0	100,00		48,3

EU-LFS ISCED categories	EU-SILC ISCED categories	EU-LFS %	EU-LFS % coded like EU-SILC	EU-SILC %	diff EU- LFS/EU- SILC	Absolute deviations
SK						
No formal or below ISCED 1	ISCED 0	0,3	0,3	0,0	0,3	0,3
ISCED 1	ISCED 1	0,5	0,5	0,1	0,4	0,4
ISCED 2	ISCED 2	11,6	11,6	8,0	3,6	3,6
ISCED 3C (shorter than 3 years)		0,0				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	0,0	73,7	75,2	-1,4	1,4
ISCED 3C (3 years and more)		35,6				
ISCED 3 A/B		38,1				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,0	0,0	0,0	0,0	0,0
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	0,8	13,9	16,8	-2,9	2,9
ISCED 5A		13,0				
ISCED 6		0,1				
		100,0	100,0	100,00		8,6
UK						
No formal or below ISCED 1	ISCED 0	0,2	0,2	0,0	0,2	0,2
ISCED 1	ISCED 1	0,0	0,0	0,0	0,0	0,0
ISCED 2	ISCED 2	14,7	28,6	19,1	9,5	9,5
ISCED 3C (shorter than 3 years)		13,9				
ISCED 3 (no further distinction possible, 3 y+)	ISCED 3	8,7	41,6	39,2	2,4	2,4
ISCED 3C (3 years and more)		18,2				
ISCED 3 A/B		14,7				
ISCED 3 or 4 (no further distinction possible)		0,0				
ISCED 4A/B	ISCED 4	0,1	0,1	5,9	-5,7	5,7
ISCED 4C		0,0				
ISCED 4 (no further distinction possible)		0,0				
ISCED 5B	ISCED 5/6	8,8	29,5	35,8	-6,3	6,3
ISCED 5A		19,7				
ISCED 6		0,9				
		100,0	100,0	100,00		24,1

Table A2: Variance explained of current ISEI by educational categories in different years of EU_SILC and different rounds of ESS using ISCED and Country Specific Educational Variables (CSEV) as predictors.

country	EU-SILC (ISCED 6)			ESS round	N	ESS	ESS	diff	diff2	diff3
	year	N				(ISCED 6)	(CSEV)			
AT	2004	3155	28,1	2002	1523		22,9			-5
AT	2005	4118	27,4	2004*	1405		39,3			12
AT	2006	3665	27,4	2006	1511		35,1			8
BE	2004	2199	36,7	2002	1107	44,9	47,6	3	8	11
BE	2005	3325	33,9	2004	1113	34,2	37,1	3	0	3
BE	2006	3168	37,8	2006	1116	41,5	45,4	4	4	8
CY	2005	3177	46,2							
CY	2006	3146	46,9	2006	624	46,7	53,7	7	0	7
CZ	2005	4029	35,4	2002	801	38,9	53,8	15	3	18
CZ	2006	3522	36,1	2004	1775	37,5	54,1	17	1	18
DE	2004			2002	1870	28,6	46,4	18		
DE	2005	8370	23,5	2004	1808	32,3	46,4	14	9	23
DE	2006	9282	22,9	2006	1835	29,6	48,2	19	7	25
DK	2003	1775	29,0	2002	1026	24,2	28,6	4	-5	0
DK	2004	3169	28,4	2004*	1015	30,8	40,0	9	2	12
DK	2005	4455	25,2							
DK	2006	3816	25,5	2006	1021	32,9	40,8	8	7	15
EE	2004	4018	28,1	2004	1183	31,0	36,2	5	3	8
EE	2005	4283	28,7							
EE	2006	4148	31,3	2006*	887	29,1	36,0	7	-2	5
ES	2004	6345	40,0	2002	900	52,9	54,1	1	13	14
ES	2005	9750	41,5	2004*	860	36,9	39,2	2	-5	-2
ES	2006	8582	41,6	2006	1159	39,2	46,4	7	-2	5
FI	2004	4218	35,0	2002	1294	36,2	37,1	1	1	2
FI	2005	5941	33,6	2004	1294	35,8	37,5	2	2	4
FI	2006	5409	34,7	2006	1198	38,0	39,1	1	3	4
FR	2004	6222	33,9	2002	952	36,0	43,9	8	2	10
FR	2005	7054	35,1	2004	1171	35,8	42,9	7	1	8
FR	2006	6681	34,7	2006*	1368	35,8	46,1	10	1	11
GR	2003	1557	51,3	2002	1263	53,8	57,2	3	2	6
GR	2004	2899	52,5	2004	1276	45,3	49,7	4	-7	-3
GR	2005	3792	50,8							
GR	2006	3556	52,7							
HU	2004			2002	1049	46,7	55,5	9		
HU	2005	4885	48,9	2004*	995	44,6	55,6	11	-4	7
HU	2006	4330	53,1	2006	931	52,6	62,8	10	0	10
IE	2004	1761	32,4	2002	1309		41,7			9
IE	2005	3229	31,9	2004	1480		40,5			9
IE	2006	2326	31,7	2006	1054		37,9			6
IS	2004	1451	33,0	2004	333	21,7	31,9	10	-11	-1
IS	2005	2258	36,2							
IS	2006	2180	31,1							
IT	2004	10891	32,9	2002	704	40,0	41,5	2	7	9
IT	2005	15051	31,9	2004*	821	42,5	44,1	2	11	12
IT	2006	13321	31,7							
LT	2005	3342	39,0							
LT	2006	2983	40,4							

LU	2003	3439	46,3	2002	822	36,8	43,4	7	-9	-3
LU	2004	3470	49,3	2004	1067	44,5	53,0	9	-5	4
LU	2005	3625	52,3							
LU	2006	3165	52,9							
LV	2005	3213	36,5							
LV	2006	2653	40,7							
NL	2004	.	.	2002	1667	31,8	34,1	2		
NL	2005	8139	36,9	2004	1304	33,5	36,0	3	-3	-1
NL	2006	7264	36,1	2006	1308	33,6	35,2	2	-2	-1
NO	2003	3716	25,8	2002	1280	31,2	33,2	2	5	7
NO	2004	3557	25,4	2004	1242	27,4	33,7	6	2	8
NO	2005	3306	24,0							
NO	2006	3177	24,5	2006	1199	31,3	37,3	6	7	13
PL	2004	.	.	2002	1275	43,4	56,2	13		
PL	2005	10434	48,2	2004*	1082	42,1	48,1	6	-6	0
PL	2006	9874	48,9	2006	1043	45,2	52,7	7	-4	4
PT	2004	2525	46,4	2002	875	48,7	49,1	0	2	3
PT	2005	3431	50,5	2004	1075	53,9	55,2	1	3	5
PT	2006	3195	49,4	2006	1261	57,2	59,3	2	8	10
SE	2004	3751	36,2	2002	1347	34,7	43,9	9	-1	8
SE	2005	5156	36,4	2004	1277	38,1	44,7	7	2	8
SE	2006	4669	35,6	2006*	1236	32,5	39,0	6	-3	3
SI	2004	.	.	2002	937	47,1	56,3	9		
SI	2005	10068	55,8	2004	717	51,3	62,5	11	-5	7
SI	2006	8200	55,2	2006	855	41,7	51,3	10	-13	-4
SK	2005	4553	36,1	2004	879	33,2	43,1	10	-3	7
SK	2006	4454	38,9	2006	1047	40,4	47,2	7	2	8
UK	2005	7225	20,8	2002	1326	26,1	34,6	9	5	14
UK	2006	5641	20,5	2006	1501	21,3	30,9	10	1	10