# Inconsistency of education data collected in surveys in Europe: Comparing LFS, SILC, ISSP, EB, EVS, and ESS

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This paper assesses and discusses the lack of consistency in educational attainment data across surveys. From earlier work on this topic we know that inconsistencies in the distribution of education coded in the International Standard Classification of Education (ISCED) exist across time and surveys. This paper presents an update on this issue using more recent data and adding surveys which had not yet been compared with other data sources. Duncan's Dissimilarity Index will be used for comparing the education distributions per country, year and survey. Given the recent changes in education coding in the ISSP and ESS, it is expected that discrepancies between official and those academic surveys have decreased. However, since there is still no documentation on how official surveys harmonise education data in ISCED 97, it is also expected that the degree of consistency between surveys, especially between official and academic surveys, is still low. There is thus still a strong need for standards and documentation concerning the bridging from country-specific education categories to cross-national ones. Potential further reasons for such inconsistencies besides processing error such as nonresponse error, social desirability, and deliberate deviations from assumed official coding rules will be discussed.

## 1. Introduction

During the last decades, cross-nationally comparative research in the social sciences rose through the increased availability of international survey data. In general, for all cross-national surveys comparable measurement is an important challenge of quantitative (variable based) research [1]. Coherence across data sources is another quality criterion set up by the European Statistical System [2]. This also includes demographic and socio-economic variables, so-called background variables. Dealing e.g. with education, occupation, employment status, income and marital status is a challenge because these variables can only be measured and interpreted appropriately by taking country-specific institutional specificities into account.

Until recently, only very little research involving small numbers of countries was done with respect to education and measurement of background variables [3][4][5][6]. Since then, more

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[1] Przeworski, A. and Teune, E. (1970), Logic of Comparative Social Inquiry - Comparative Studies in Behavioral Science, A Wiley Series.
[2] Eurostat (2011), European Statistics Code of Practice for the National and Community Statistical Authorities.
[3] Smith, T. (1995), Some Aspects of Measuring Education, Social Science Research, Vol. 24, 215-242.

research considering these different kinds of demographic variables has been performed and new or improved harmonisation procedures were developed. With respect to educational attainment, recent research evaluating and improving measurement instruments and harmonisation strategies for a large number of countries is done by Schneider [7][8][9].

The aim of this paper is to evaluate the coherence of harmonised European cross-national data with respect to the variable "highest level of education attained". This will be done by comparing distributions across data sets using Duncan's Dissimilarity Index like in [7], but using more recent data from the EU-LFS, EU-SILC, ESS, the ISSP, EVS and Eurobarometer, some of which were not yet analysed in this context.

## 2. Methodological background

### 2.1. Harmonisation

Whenever country specificities (such as institutions, laws and history) prevent the 'simple' translation and thus input harmonisation of questionnaire items, comparative survey designers need to plan how to make these variables comparable over countries and cultures in advance of the survey. This process is called ex-ante output harmonisation and mostly affects demographic and socio-economic variables.

With respect to educational qualifications, translation is not possible due to the fact that educational certificates, systems, and institutions differ by country and their labels are proper names rather than universal descriptors. Consequently, generic descriptions of education levels are not understood in the same way across countries. Thus ex-ante output harmonisation is used by specifying a cross-national coding framework in advance of data collection. The choice of cross-national coding framework influences the country-specific

[4] Braun, M. and Müller, W. (1997), Measurement of Education in Comparative Research, Comparative Social Research, Vol. 16, 163-201.
[5] Kerckhoff, A. et al. (2002), Toward an Improved Measure of Educational Attainment in Social Stratification Research, Social Sciences Research, Vol. 31, 99-123.
[6] Hoffmeyer-Zlotnik, J. H. P. and Wolf, C. (2003), Advances in Cross-National Comparison – A European Working Book for Demographic and Socio-Economic Variables, Kluwer Academic / Plenum Publishers.
[7] Schneider, S. L. (2008), The International Standard Classification of Education (ISCED-97) – An Evaluation of Content and Criterion Validity for 15 European Countries. Mannheim Zentrum für Europäische Sozialforschung.
[8] Schneider, S. L. (2009) Confusing Credentials: The Cross-Nationally Comparable Measurement of Educational Attainment, DPhil thesis, University of Oxford.
[9] Schneider, S. L. (2010), Nominal Comparability is not enough: (In-)Equivalence of Construct alidity of Cross-National Measures of Educational Attainment in the European Social Survey, Research in Social Stratification and Mobility, Vol. 28, 343-357.

data collection instruments [10][11] by dictating the minimum level of detail and kinds of distinctions required. In the national questionnaire usually lists of country-specific educational qualifications are shown to the respondent and these categories are recoded to the cross-national coding scheme after data collection (although the mapping is ideally also specified ex-ante).

*2.2. International Standard Classification of Education (ISCED)*

One such cross-national coding framework is provided by the International Standard Classification of Education (ISCED) 1997, which is used in a lot of surveys for comparing educational attainment across countries.

ISCED was designed by UNESCO in the 1970s and reformed in 1997 and 2011. The aim of ISCED is to "serve as an instrument suitable for assembling, compiling and presenting comparable indicators and statistics of education both within individual countries and internationally" [12]. The ISCED variable in most surveys consists of information on the level of education only:

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

Other dimensions of differentiation within education levels such as vocational and general education or whether a qualification allows access to a higher level of education are not reflected in most surveys.

## 3. Data and Method

*3.1. Analysis strategy*

In order to give a broad overview of the degree of (in)consistency of harmonised education variables, data from six cross-national surveys covering almost all European countries are

[10] Ehling, M. (2003), Harmonising Data in Official Statistics: Development, Procedures, and Data Quality, 17-31, in: Advances in Cross-National Comparison – A European Working Book for Demographic and Socio-Economic Variables, edited by Hoffmeyer-Zlotnik, J.H.P. and Wolf, C., Kluwer Academic / Plenum Publishers.
[11] Hoffmeyer-Zlotnik, J.H.P. and Warner U. (2014), Harmonising Demographic and Socio-Economic Variables for Cross-National Comparative Survey Research, Springer.
[12] UNESCO-UIS, 1997 [2006], ISCED 1997 – International Standard Classification of Education.

included in this study. Firstly, we check whether education distributions in two official data sets are consistent with each other. Secondly, for identifying the effects of methodological changes in ESS and ISSP, we compare different points in time for these. Finally, we compare the distribution of the harmonised education variable across official and academic surveys. For all surveys, respondents between age 25 and 64 are included and data are weighted. In the following, we briefly introduce the data sets covered.

*3.2.    Comparative survey data*

The European Union Labour Force Survey (EU-LFS) and the European Union Statistics on Income and Living Conditions (EU-SILC) where chosen in order to both evaluate whether different official surveys are consistent with each other, and to serve as a comparison standard for academic surveys. This follows the strategy in Schneider [7]. Both surveys are centrally processed by Eurostat, but harmonisation of education variables presumably takes place in the statistical institutes of the EU member states.

The LFS provides a harmonised education variable consisting of 13 categories. Besides the seven main ISCED levels, these categories differentiate programme destination and (partly) duration of programmes. From this variable a less detailed ISCED variable reflecting the main levels can easily be recoded (Table 1). Due to the rotating sample only the spring (second) quarters of the LFS data are used in the analyses. The harmonised education variable in the EU-SILC contains the main levels of ISCED 97, but categories 5 and 6 were aggregated in one category (Table 2).

After analysing the coherence of official data, three academically driven cross-national surveys will be compared over time and with the official data. The European Social Survey (ESS) is part of the analyses because with round 5 the education variables changed with the aim to achieve more informative comparable education variables, given research showing that ISCED main levels are not very useful in multivariate analyses and the loss of information through harmonisation differs so much across countries that the resulting data are in fact *not* comparable [8]. Up to ESS round 4 the harmonised education variable consisted of ISCED 97 main levels, but categories 0 and 6 were integrated in categories 1 and 5 respectively (Table 3). The country-specific answer categories and the harmonised education variable changed with round 5, introducing a detailed cross-national variable closely related to ISCED 2011 (Table 4).

The International Social Survey Programme (ISSP) is included in this study because the ISSP education variable has not yet been compared with other surveys and because of a change in the harmonised variable in 2011. What is special about the ISSP is that all demographic variables are drawn from national survey programmes since the ISSP is not a stand-alone comparative survey but consists of comparative modules added on to national surveys in most countries. Up to 2010, the categories of this variable did not follow ISCED 97 concepts and terminology but had categories such as *lowest formal qualification* and *above lowest qualification.* The lowest certificate depends on the education system of the countries and may belong to ISCED levels 1, 2 or even 3. For these categories the correspondence with ISCED 97 is thus not given and discrepancies can expected to be large. The harmonised variable in 2011 is extended from 6 to 7 categories and the content of the categories has changed (see Table 5 and Table 6). The new variable however still does not closely correspond to ISCED: upper secondary qualifications not giving access to universities are coded in level 4 rather than 3. This was done in order to improve the analytical value of the cross-national education variable in the ISSP, disregarding consistency with ISCED. In fact qualifications classified in category 3 and 4 in the ISSP have very different outcomes, so that from a validity point of view this distinction is highly useful. A fair comparison with other surveys would have to aggregate categories 3 and 4 in ISSP and other surveys, which we will do in the next version of this paper. With regard to category 6 *Upper level tertiary (Master, Dr.),* there is no possibility to differentiate between ISCED 5A and 6.

The third non-official cross-national survey included is the European Values Study 2008 (EVS), also because the consistency of the education variable with other data sources has not yet been analysed. The EVS 2008 contains three ISCED variables. One consists of the seven main ISCED 97 levels and is used on our analyses (Table 7). The other two variables include further information on the orientation of the programmes (general, vocational, and pre-vocational) and on programme duration, not used in this study.

The Eurobarometer (EB) is a politically driven survey which is also widely used in social and political research, which is why it is included in our analyses. ISCED 97 main levels were implemented in two Standard and Special Eurobarometer studies, EB73.2 & 73.3 in 2010 and EB75.4 in 2011 (Table 8).

To conclude, in most of these surveys, only the main ISCED levels are available. Because EU-SILC, ESS rounds 1-4 as well as ISSP do not distinguish between ISCED levels 5 and 6, we combine those two ISCED levels for all surveys. Furthermore, because ISCED levels 0

and 1 cannot be differentiated in the ISSP as well as in ESS rounds 1-4 and ISCED 0 is a very small category in the other surveys, those levels are combined as well. We thus reduce the 7 level variable to 5 levels.

*3.3.    Duncan's Dissimilarity Index*

For comparing the education distributions per country, Duncan's Dissimilarity Index is used [13]. The index was originally developed for measuring residential segregation, but it can be generalised to measure differences in the distributions of categorical variables. The dissimilarity index can be interpreted as the percentage of cases that would have to change categories in order to achieve equal distributions across the two surveys or two survey years compared. The index is rescaled to range from 0 to 100 in order to refer to percentages; normally it ranges from 0 to 1. Formally, if $x_i$ denotes the size of category $i$ out of $k$ ISCED categories referring to a specific country in data source A and $y_i$ denotes the same for data source B, the dissimilarity index is defined as: $D = \frac{1}{2} \sum_{i=1}^{k} |xi - yi|$ [12][7].

## 4. Results

*4.1.    Inconsistency across time and surveys in EU-LFS and EU-SILC*

Considering both EU-LFS and EU-SILC over time, Duncan's index of dissimilarity is rather low (Table 9). In most countries the percentage of cases that would have to switch categories to get an equal distribution is less than 5. The mean value of the index regarding EU-SILC data lies between 2 and 3 percent, regarding the EU-LFS around 2.6.

Comparing across the LFS and SILC within years (also Table 9), deviations in the distributions across countries for the years 2008 to 2011 are larger than within-survey differences over years, but still rather small. The mean value across all countries is 5 percent. However, for Luxembourg, Poland and Switzerland the percentages are higher than 10 percent. The lowest discrepancies are achieved for Norway, Denmark and the Czech Republic, where Duncan's index is between 0.5 and 2 percent.

*4.2.    Inconsistency over time in ESS and ISSP data*

The changes in the ESS methodology become visible through high values of Duncan's dissimilarity index comparing ESS rounds 4 and 5 (see Table 10). Large changes are visible

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[13] Duncan, O.D. and Duncan, B. (1955), A Methodological Analysis of Segregation Indexes, American Sociological Review, Vol. 20, 210-217.

for Poland with nearly 30 percent and for the UK with a deviation of 20 percent. The mean value of Duncan's index for all 26 countries participating in both rounds is nearly 10 percent; by excluding the UK and Poland the mean value is 8 percent. Only few countries have changes of distributions of less than 5%. However, perceptible differences in distributions (D=6 to 7) also occurred between earlier rounds without substantial methodological changes.

The changes introduced in the ISSP are much larger and especially large for France, Switzerland and Turkey, where Duncan's index is 50. In Germany the discrepancy even amounts to around 65 percent, while before and after the change it is less than 4 percent. Comparing the 17 countries participating in the ISSP in 2010 and 2011, the distributions on average differ by nearly 37 percent (Table 11). In summary, the distributions of the ISSP are even less consistent over time than those of the ESS, so that the methodological changes in the measurement of education must be regarded as more consequential for the ISSP.

### 4.3. *Inconsistency across official, political and academic surveys*

For this final comparison EU-LFS is used as a reference point and for ESS and ISSP only two rounds are included to present the consequences of the methodological changes. EVS and Eurobarometer are also included in this analysis. All results are contained in Table 12.

Comparing ESS rounds 4 and 5 with LFS data gives mixed results. Belgium, the Czech Republic, Finland, France, the Netherlands and Poland show higher inconsistencies with LFS data in ESS round 5 than 4. In contrast, the UK, Greece, Ireland and Norway become more similar with the official data in ESS round 5. The mean value of Duncan's index for the 22 countries participating in both surveys for 2008 is 10.5 percent and 11.1 percent in 2011 so that on average, discrepancies increased only slightly with the revision. This does not come entirely as a surprise because ESS round 1-4 data were corrected for misclassifications when introducing the new measures for ESS round 5 to make rounds as consistent as possible.

Considering the ISSP 2008 and 2011, consistency with official data is low in 2008 and becomes even worse in 2011. The coherence of ISSP and EU data only improves for Belgium and Portugal. Duncan's dissimilarity index across 16 countries participating in all surveys rises from 17 in 2008 to 32 in 2011. For Denmark, Germany, Switzerland and the UK even 40 to nearly 60 percent have to change categories to reach the same distribution as official data. To a large degree, this is due to the fact that the ISSP education variable was not designed to correspond to ISCED levels in order to measure education in a more valid way (see 3.2).

With respect to the comparison of EVS 2008 and EU-LFS 2008, the mean value of Duncan's index across all 30 European countries is 15 percent. Lower discrepancies, less than 10 percent, are achieved for Belgium, Bulgaria, the Czech Republic, Hungary and the Slovak Republic. The largest discrepancy with 35 percent is again found for the UK.

Analysing the EB and the EU-LFS data from 2010 and 2011, high inconsistencies of around 40 percent can be found for Malta, Hungary and the Netherlands. Still one fourth has to switch categories to achieve equal distributions across surveys in Norway, Germany, Estonia, Finland, Spain and Sweden. The lowest discrepancies are observed for Bulgaria, Slovenia and the Slovak Republic where less than 10 percent would have to change categories. The mean of Duncan of 26 European countries for 2010 is 18 percent and for 2011 it is 17 percent.

To summarise, all academic and political surveys produce substantially different education distributions than the EU-LFS: For all surveys inconsistencies with data from official statistics exist and persist. While the highest similarities can be observed between the ESS and the EU-LFS (before *and* after measurement changes in 2010), the lowest coherence is found with respect to the ISSP after the target variable changed in 2011. EVS, EB and ISSP 2008 lie in between. But even the comparatively small differences between ESS and EU-LFS are substantially larger than those found between EU-LFS and EU-SILC (see section 4.1).

**5. Discussion**

What are potential reasons for the identified inconsistencies in the distribution of the education variables across surveys and time? Four main reasons can be distinguished: 1. real change/differences, 2. differential unit or item nonresponse, 3. differential measurement error and 4. differential processing error.

While real change over time will account for some differences across survey years within surveys, these should be small. In this study we showed several surveys referring to the same year revealing large differences, which cannot be 'real'. Therefore, reasons for the large discrepancies we found must lie elsewhere. Differential unit-nonresponse is a more likely candidate explanation. Especially when comparing surveys with low response rates, differential selectivity by level of education could explain some of the discrepancies because more highly educated people are more inclined to participate in surveys. Given the high response rates in the EU-LFS and much lower response rates in academic surveys, the error in this case will be on the side of the academic surveys, which could (and do) develop

adjustment weights to counter this effect. Selective and differential item nonresponse is another potential culprit for distributional differences across surveys. E.g. for the UK, a lot of missing cases on the 'highest education' variable can be identified in all surveys. One reason for this is that in the UK LFS, migrants by default have 'other' education which cannot be coded in ISCED and ends up as missing. In countries using several questionnaire items for measuring education, different treatment of missing data in individual questions across surveys may entail fairly substantial differences in resulting distributions of the derived education variable.

The third reason lies in the data collection instrument and response behaviour that differ across surveys (and less so across survey rounds). For example, in the ISSP vocational schools of the health sector in Germany (Gesundheitsschulen zur Ausbildung von Krankenschwestern- und –pflegern) are not mentioned, while they are included in the show cards for other surveys. Therefore the level of education of nurses is likely underestimated in the ISSP for Germany, pushing the distribution downwards. It is also possible that social desirability is higher in academic than in official surveys, resulting in an over reporting of higher qualifications in the former.

However, we believe the main reason for unequal distributions to be inconsistent coding of the country-specific education categories into ISCED over time but especially across surveys. Such inconsistencies can exist for two reasons: 'accidental' misclassifications mostly due to lacking information on the official mapping of country-specific education categories to ISCED,[14] and deliberate deviations from the official mapping. Problems with misclassifications are very common and were e.g. documented for ESS rounds one to three by Schneider [7] and Kieffer [15] 2010 (data were corrected since then). Right coding is a challenging task and needs to be trained [16], which hardly seems to happen for most surveys. Such training as well as the identification of coding problems and the application of 'standards' from official surveys in academic surveys relies on documentation, which is largely inexistent for official surveys. The published ISCED mappings by UNESCO are

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[14] For example, in the Eurobarometer the national certificates of HBS (Hogere Burgerschool), VWO (voorbereidend wetenschappelijk onderwijs) and MBO (middelbaar beroepsonderwijs) are coded into category 4. Whereas in the EVS, ESS, and ISSP the certificates of VWO, HBS and MBO are mapped with ISCED category 3, which is correct. Category 4 in EVS and ESS include only the certificate of the MBO-plus courses which offers additional vocational subjects.

[15] Kieffer, A. (2010), Measuring and Comparing Levels of Education: Methodological Problems in the Classification of Educational Levels in the European Social Surveys and the French Labor Force Surveys, Bulletin de Méthodologie Sociologique, Vol. 107, 49-73.

[16] Granda, P., et al. (2010), Harmonizing Survey Data, in: Survey Methods in Multinational, Multiregional, and Multicultural Contexts, edited by Harnkess, J. et al., John Wily&Sons.

helpful, but for the official surveys it is not clear whether these mappings were used and if yes, which version of the mappings was used (since they change over time) or whether there are deviations from those mappings. How are non-official surveys meant to implement ISCED 'correctly' if there is no information on what the 'correct' mapping is?

Deliberate deviations in the mapping of country-specific categories to ISCED are more than 'just' an issue of documentation and transparency. Such deviations are made when there are substantive doubts in the way a qualification is officially mapped in ISCED. In the end, ISCED definitions are rather soft and can be interpreted differently. Given the high visibility of education statistics and their political relevance, it is likely that in some countries strong pressures exist to interpret ISCED and classify qualifications in a politically desirable manner. Academic surveys may chose not follow this. In the ESS e.g. it was decided for the UK to map the General Certificate of Secondary Education (GCSE) grades A to C to ISCED level 2 rather than 3, where it is officially coded. Inconsistent treatment of this single qualification is likely the main reasons for the repeated large differences of education distributions across surveys and time observed for the UK.

## 6. Conclusions

By this update on the question of inconsistency of measuring educational attainment across time and surveys, we draw the conclusion that harmonisation of educational attainment data in surveys is still failing. Only EU-LFS and EU-SILC come reasonably close. Sometimes incoherence between surveys is deliberate, e.g. the ISSP 2011 chose to improve the validity of the harmonised education measure (while being comparable) rather than to increase compliance with ISCED, producing the largest discrepancies. In the ESS, after data from earlier rounds were corrected for misclassification, there is no more difference in the coherence with LFS data between earlier and later rounds. Finally, inconsistencies affect some countries more than others, with the UK 'leading' the table. Several reasons for these inconsistencies were presented, with lacking documentation identified as a major factor.

Next steps will be to focus on a single dataset (EVS, ISSP or Eurobarometer) and to get more into detail finding misclassifications of the country-specific variables to ISCED. Due to missing transparency of the official data sets which could otherwise serve as an example, future quality checks of both official and other surveys are hover severely hindered. It is hoped that with the introduction of ISCED 2011 in EU statistics, this practice will change.

# 7. Appendix

**Table 1 Categories and recodes of EU-LFS education variable (HATLEVEL)**

| Code | Value | ISCED 97_5 |
|------|-------|-----------|
| 0 | No formal education or below ISCED 1 | 1 |
| 11 | ISCED 1 | 1 |
| 21 | ISCED 2 | 2 |
| 22 | ISCED 3c (shorter than 2 years) | 3 |
| 30 | ISCED 3 (without distinction a, b or c possible, 2 years and more) | 3 |
| 31 | ISCED 3c (2 years and more) | 3 |
| 32 | ISCED 3 a, b | 3 |
| 41 | ISCED 4a, b | 4 |
| 42 | ISCED 4c | 4 |
| 43 | ISCED 4 (without distinction a, b or c possible) | 4 |
| 51 | ISCED 5b | 5 |
| 52 | ISCED 5a | 5 |
| 60 | ISCED 6 | 5 |

**Table 2 Categories and recodes of EU-SILC education variable (PE040)**

| Code | Value | ISCED 97_5 |
|------|-------|-----------|
| 0 | pre-primary education | 1 |
| 1 | primary education | 1 |
| 2 | lower secondary education | 2 |
| 3 | (upper) secondary education | 3 |
| 4 | post-secondary non-tertiary education | 4 |
| 5 | 1st & 2nd stage of tertiary education | 5 |

**Table 3 Categories and recodes of the ESS education variable (edulvla) until 2008**

| Code | Values | ISCED 97_5 |
|------|--------|-----------|
| 1 | Less than lower secondary education (ISCED 0-1) | 1 |
| 2 | Lower secondary education completed (ISCED 2) | 2 |
| 3 | Upper secondary education completed (ISCED 3) | 3 |
| 4 | Post-secondary non-tertiary education completed (ISCED 4) | 4 |
| 5 | Tertiary education completed (ISCED 5-6) | 5 |

**Table 4 Categories and recodes of the ESS education variable (edulvlb) since 2010**

| Code | Values | ISCED 97_5 |
|------|--------|-----------|
| 0 | Not completed ISCED level 1 | 1 |
| 113 | ISCED 1, completed primary education | 1 |
| 129 | Vocational ISCED 2C < 2 years, no access ISCED 3 | 1 |
| 212 | General/pre-vocational ISCED 2A/2B, access ISCED3 vocational | 2 |
| 213 | General ISCED 2A, access ISCED 3A general/all 3 | 2 |
| 221 | Vocational ISCED 2C >= 2 years, no access ISCED 3 | 2 |
| 222 | Vocational ISCED 2A/2B, access ISCED 3 vocational | 2 |
| 223 | Vocational ISCED 2, access ISCED 3 general/all | 2 |
| 229 | Vocational ISCED 3C < 2 years, no access ISCED 5 | 2 |
| 311 | General ISCED 3 >=2 years, no access ISCED 5 | 3 |
| 312 | General ISCED 3A/3B, access ISCED 5B/lower tier 5A | 3 |

| 313 | General ISCED 3A, access upper tier ISCED 5A/all 5 | 3 |
|-----|---------------------------------------------------|---|
| 321 | Vocational ISCED 3C >= 2 years, no access ISCED 5 | 3 |
| 322 | Vocational ISCED 3A/3B, access 5B/lower tier 5A | 3 |
| 323 | Vocational ISCED 3A, access upper tier ISCED 5A/all 5 | 3 |
| 412 | General ISCED 4A/4B, access ISCED 5B/lower tertiary 5A | 4 |
| 413 | General ISCED 4A, access upper tier ISCED 5A/all 5 | 4 |
| 421 | ISCED 4 programmes without access ISCED 5 | 4 |
| 422 | Vocational ISCED 4A/4B, access ISCED 5B/lower tertiary 5A | 4 |
| 423 | Vocational ISCED 4A, access upper tier ISCED 5A /all 5 | 4 |
| 510 | ISCED 5A short, intermediate/academic/general tertiary below | 3 |
| 520 | ISCED 5B short, advanced vocational qualifications | 5 |
| 610 | ISCED 5A medium, bachelor/equivalent from lower tertiary | 5 |
| 620 | ISCED 5A medium, bachelor/equivalent from upper/single tertiary | 5 |
| 710 | ISCED 5A long, master/equivalent from lower tertiary | 5 |
| 720 | ISCED 5A long, master/equivalent from upper/single tertiary | 5 |
| 800 | ISCED 6, doctoral degree | 5 |

**Table 5 Categories and recodes of the ISSP education variable (DEGREE) until 2010**

| Code | Value | ISCED 97_5 |
|------|-------|------------|
| 0 | No formal qualification | 1 |
| 1 | Lowest formal qualification | 2 |
| 2 | Above lowest qualification | 3 |
| 3 | Higher secondary completed | 3 |
| 4 | Above higher secondary level, other qualification | 5 |
| 5 | University degree completed | 5 |

**Table 6 Categories and recodes of the ISSP education variable (DEGREE) since 2011**

| Code | Value | ISCED 97_5 |
|------|-------|------------|
| 0 | No formal education | 1 |
| 1 | Primary school | 1 |
| 2 | Lower secondary (secondary education completed that does not allow entry to university: end of obligatory school but also short programs (less than 2 years)) | 2 |
| 3 | Upper secondary (programs that allow entry to university) | 3 |
| 4 | Post secondary, non-tertiary (other upper secondary programs toward the labour market or technical formation) | 4 |
| 5 | Lower level tertiary, first stage (also technical schools at a tertiary level) | 5 |
| 6 | Upper level tertiary (Master, Dr.) | 5 |

**Table 7 Categories and recodes of the EVS 2008 education variable (v336)**

| Code | Values | ISCED 97_5 |
|------|--------|------------|
| 0 | Pre-primary education or none education | 1 |
| 1 | Primary education or first stage of basic education | 1 |
| 2 | Lower secondary or second stage of basic education | 2 |
| 3 | (Upper) secondary education | 3 |
| 4 | Post-secondary non-tertiary education | 4 |
| 5 | First stage of tertiary education | 5 |
| 6 | Second stage of tertiary education | 5 |

**Table 8 Categories and recodes of the Eurobarometer education variable (v362 in 2010, v105 in 2011)**

| Code | Values | ISCED 97_5 |
|------|--------|------------|
| 0 | Pre-primary education | 1 |
| 1 | Primary education or first stage of basic education | 1 |
| 2 | Lower secondary or second stage of basic education | 2 |
| 3 | (Upper) secondary education | 3 |
| 4 | Post-secondary, non-tertiary education | 4 |
| 5 | First stage of tertiary education | 5 |
| 6 | Second stage of tertiary education | 5 |

**Table 9 Duncan's Dissimilarity Index for educational attainment distributions in official survey data**

|  | LFS 2008 - 2010 | LFS 2010 - 2011 | SILC 2008 - 2010 | SILC 2010 - 2011 | LFS - SILC 2008 | LFS - SILC 2010 | LFS - SILC 2011 |
|------|------|------|------|------|------|------|------|
| AT | 1,73 | 1,02 | 2,21 | 0,92 | 3,17 | 2,91 | 1,96 |
| BE | 2,87 | 1,50 | 2,14 | 4,23 | 5,96 | 4,17 | 4,88 |
| BG | 1,26 | 0,96 | 5,78 | 1,10 | 5,28 | 0,74 | 1,55 |
| CH | 5,55 | 0,20 |  |  |  |  | 14,16 |
| CY | 1,54 | 2,26 | 1,81 | 3,06 | 2,49 | 3,65 | 2,88 |
| CZ | 2,26 | 1,50 | 2,22 | 1,33 | 0,29 | 0,67 | 0,63 |
| DE | 1,29 | 0,91 | 2,40 | 0,91 | 1,63 | 3,74 | 3,07 |
| DK | 1,90 | 1,02 | 1,62 | 1,02 | 1,55 | 1,96 | 1,21 |
| EE | 2,12 | 2,60 | 3,15 | 1,56 | 5,71 | 4,55 | 5,78 |
| ES | 0,70 | 1,59 | 3,19 | 1,62 | 2,58 | 3,62 | 2,44 |
| FI | 1,53 | 1,84 | 3,05 | 2,40 | 10,33 | 7,93 | 6,53 |
| FR | 1,63 | 0,78 | 5,47 | 6,15 | 4,07 | 8,29 | 8,74 |
| GB | 5,21 | 2,30 | 6,54 | 1,21 | 6,99 | 8,71 | 6,87 |
| GR | 1,59 | 2,23 | 4,86 | 2,47 | 4,07 | 6,79 | 6,38 |
| HR | 2,95 | 1,38 |  |  |  |  | 5,08 |
| HU | 1,83 | 0,84 | 1,22 | 1,02 | 3,26 | 3,34 | 4,36 |
| IE | 5,52 | 1,45 | 6,22 |  | 5,97 | 7,03 |  |
| IS | 3,39 | 28,31 | 3,24 | 1,24 | 3,51 | 2,71 | 28,45 |
| IT | 1,96 | 1,27 | 2,04 | 3,00 | 3,53 | 3,47 | 3,27 |
| LT | 1,87 | 3,17 | 5,52 | 1,50 | 2,57 | 3,44 | 4,74 |
| LU | 8,48 | 2,47 | 2,45 | 1,59 | 7,86 | 18,33 | 15,22 |
| LV | 3,06 | 3,19 | 3,85 | 1,70 | 2,46 | 4,43 | 2,87 |
| MT |  | 3,82 |  | 1,94 |  | 7,24 | 6,96 |
| NL | 0,72 | 0,65 | 2,15 | 0,83 | 3,73 | 4,34 | 5,45 |
| NO | 1,76 | 0,94 | 3,68 | 0,84 | 1,68 | 1,35 | 1,40 |
| PL | 2,85 | 0,75 | 2,03 | 1,08 | 13,30 | 11,84 | 11,28 |
| PT | 4,40 | 5,56 | 5,32 | 3,88 | 2,31 | 3,66 | 1,56 |
| RO | 2,18 | 1,10 | 2,18 | 3,49 | 4,61 | 1,98 | 2,97 |
| SE | 1,77 | 1,20 | 3,72 | 0,71 | 2,01 | 3,20 | 2,71 |
| SI | 1,50 | 1,78 | 1,76 | 0,98 | 2,14 | 1,91 | 2,72 |
| SK | 2,30 | 1,30 | 4,92 | 1,42 | 5,77 | 6,16 | 6,37 |
| **mean** | **2,59** | **2,58** | **3,38** | **1,90** | **4,24** | **4,90** | **5,75** |
| **mean of 27 countries** | **2,36** | **2,70** | **3,28** | **1,90** | **4,18** | **4,74** | **5,42** |

**Table 10 Duncan's Dissimilarity Index for educational attainment distributions across ESS rounds**

|  | ESS 2002-2004 | ESS 2004- 2006 | ESS 2006-2008 | ESS 2008- 2010 | ESS 2010-2012 |
|------|------|------|------|------|------|
| AT | 15,68 | 4,04 |  |  |  |
| BE | 2,23 | 1,96 | 3,84 | 9,60 | 8,54 |
| BG |  |  | 5,06 | 3,10 | 4,91 |
| CH | 0,79 | 7,36 | 3,28 | 8,18 | 1,54 |
| CY |  |  | 8,77 | 7,65 | 8,93 |
| CZ | 2,85 |  |  | 14,64 | 8,64 |
| DE | 1,78 | 5,08 | 8,24 | 2,75 | 5,90 |

| | | | | | |
|---|---|---|---|---|---|
| DK | 13,79 | 2,79 | 4,37 | 8,47 | 5,31 |
| EE | | 6,77 | 6,64 | 11,55 | 1,70 |
| ES | 8,83 | 7,29 | 8,09 | 8,95 | 5,57 |
| FI | 6,21 | 1,89 | 3,41 | 13,40 | 4,52 |
| FR | 2,62 | 3,84 | 8,62 | 10,08 | |
| GB | 14,03 | 23,17 | 3,71 | 20,03 | 2,77 |
| GR | 3,53 | | | 11,56 | |
| HR | | | | 4,11 | |
| HU | 18,22 | 11,55 | 5,34 | 6,01 | |
| IE | 4,41 | 12,61 | 3,97 | 15,58 | 4,27 |
| IL | | | | 11,97 | 5,85 |
| LU | 6,18 | | | | |
| NL | 4,84 | 3,46 | 5,47 | 11,03 | 5,72 |
| NO | 21,90 | 5,24 | 7,06 | 3,50 | 3,69 |
| PL | 4,46 | 2,51 | 8,22 | 29,59 | 2,55 |
| PT | 2,40 | 3,37 | 7,68 | 3,16 | 7,34 |
| RU | | | 3,91 | 2,57 | 11,90 |
| SE | 1,48 | 4,99 | 6,82 | 15,65 | 3,33 |
| SI | 4,11 | 4,80 | 2,16 | 3,21 | 3,47 |
| SK | | 1,71 | 8,86 | 3,81 | 1,30 |
| UA | | 2,49 | 17,60 | 8,61 | |
| **mean** | **7,02** | **5,85** | **6,41** | **9,57** | **5,13** |
| **mean of 13 countries** | **6,68** | **5,68** | **5,56** | **10,58** | **4,63** |

Source: ESS 2002 – 2012. Respondents aged 25 – 64. Weighted using the design weight (dweight). Own calculation.

**Table 11 Duncan's Dissimilarity Index for educational attainment distributions across ISSP rounds**

| | ISSP 2008-2009 | ISSP 2009-2010 | ISSP 2010-2011 | ISSP 2011-2012 |
|---|---|---|---|---|
| AT | 18,47 | 0,00 | | |
| BE | 1,62 | 4,67 | 25,30 | |
| BG | | 5,71 | 45,07 | 0,00 |
| CH | 0,90 | 2,26 | 56,87 | 8,20 |
| CY | 7,77 | | | |
| CZ | 15,78 | 17,88 | 39,70 | 9,03 |
| DE | 1,80 | 1,68 | 65,63 | 3,97 |
| DK | 2,93 | 6,26 | 33,29 | 0,20 |
| ES | 28,23 | 29,80 | | |
| FI | 2,25 | 6,27 | 33,38 | 5,12 |
| FR | 1,83 | 5,81 | 54,07 | 28,38 |
| GB | 4,09 | 4,63 | 37,38 | 23,55 |
| HR | 0,00 | 6,39 | 31,57 | |
| HU | 2,06 | | | |
| IE | 0,00 | | | |
| IL | | | | 5,21 |
| IT | 5,67 | | | |
| LT | | | 44,54 | 23,23 |
| LV | 0,00 | 0,57 | | |
| NO | 2,31 | 4,24 | 22,63 | 5,86 |
| PL | 0,24 | | | 0,00 |
| PT | 1,09 | | | |
| RU | 2,09 | 30,48 | 21,02 | |
| SE | 4,61 | 1,76 | 21,68 | 4,58 |
| SI | 0,00 | 3,30 | 27,73 | 6,87 |
| SK | 0,30 | 0,00 | 29,63 | 0,00 |
| TR | 3,46 | 7,00 | 53,01 | |
| UA | 0,34 | | | |
| **mean** | **4,31** | **7,30** | **37,79** | **8,28** |
| **mean of 10 countries** | **3,59** | **5,18** | **36,51** | **8,76** |

**Table 12 Duncan's Dissimilarity Index comparing educational attainment distributions of academic surveys and Eurobarometer with EU-LFS**

| | ESS- LFS 2008 | ESS- LFS 2010 | ISSP - LFS 2008 | ISSP - LFS 2011 | EVS - LFS 2008 | EB - LFS 2010 | EB - LFS 2011 |
|---|---|---|---|---|---|---|---|
| AT | | | 18,53 | | 11,78 | 17,98 | 14,66 |
| BE | 6,58 | 12,08 | 20,90 | 11,89 | 8,90 | 17,68 | 8,97 |
| BG | 1,46 | 3,55 | | 37,77 | 4,97 | 8,37 | 7,88 |
| CH | 4,92 | | 5,29 | 48,80 | 9,05 | | |
| CY | 7,94 | 5,31 | 23,19 | | 18,17 | | |
| CZ | 6,14 | 12,37 | 3,41 | 36,26 | 3,28 | 10,36 | 7,48 |
| DE | 8,87 | 5,17 | 19,38 | 52,94 | 10,63 | 20,70 | 28,08 |
| DK | 17,24 | 19,28 | 29,31 | 58,51 | 10,41 | 15,07 | 13,27 |
| EE | 10,53 | 10,19 | | | 34,91 | 22,60 | 13,25 |
| ES | 11,36 | 10,06 | 33,08 | | 21,65 | 22,01 | 25,09 |
| FI | 4,78 | 15,24 | 21,76 | 25,51 | 28,23 | 19,75 | 17,47 |
| FR | 4,84 | 10,10 | 16,22 | 35,00 | 11,18 | 9,76 | 11,59 |
| GB | 40,52 | 25,16 | 24,80 | 45,66 | 36,81 | 16,16 | 10,38 |
| GR | 19,21 | 11,34 | | | 15,17 | 11,77 | 8,73 |
| HR | 10,98 | 7,01 | 10,04 | 16,76 | 6,97 | | |
| HU | 5,55 | 5,41 | 3,23 | | 5,05 | 41,96 | 37,04 |
| IE | 18,88 | 6,99 | 37,35 | | 11,71 | 18,63 | 17,74 |
| IS | | | | | 15,91 | 14,90 | |
| IT | | | 39,21 | | 14,75 | 15,15 | 16,10 |
| LT | | 18,54 | | 16,50 | 21,56 | 11,70 | 13,96 |
| LU | | | | | 11,04 | 11,79 | 8,00 |
| LV | 7,35 | | 12,38 | | 19,11 | 31,94 | 35,39 |
| MT | | | | | | 44,47 | 40,11 |
| NL | 11,33 | 17,22 | 12,06 | 30,15 | 22,19 | 39,31 | 42,76 |
| NO | 13,79 | 8,71 | 19,43 | 23,36 | 20,11 | 26,80 | |
| PL | 5,02 | 32,95 | 13,65 | 32,16 | 14,16 | 3,17 | 4,98 |
| PT | 3,36 | 3,56 | 52,38 | 8,72 | 11,43 | 4,59 | 11,34 |
| RO | 10,56 | | | | 8,97 | 13,81 | 9,99 |
| SE | 8,45 | 9,79 | 11,81 | 28,80 | 22,86 | 23,69 | 26,81 |
| SI | 5,62 | 3,80 | 3,70 | 26,38 | 26,08 | 4,86 | 4,01 |
| SK | 8,57 | 9,81 | 4,15 | 31,47 | 2,68 | 4,48 | 4,67 |
| **mean** | **10,15** | **11,46** | **18,92** | **31,48** | **15,32** | **17,98** | **16,91** |
| **mean of 13 countries** | **10,10** | **13,58** | **17.96** | **32,57** | **16,07** | **14,58** | **14,75** |