

Occupation Coding using ISCO-08

Training session for PIAAC

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AGENDA

1. Occupations and occupational status
2. ISCO-08
 - General principles
 - Comparison with ISCO-88 and ISCO-68
 - Problems with ISCO-08Break: Please submit questions!
3. Questions and Answers
4. Do's and Dont's of Occupation Coding

Occupations

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Occupations and Occupational Status

Occupations

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Why are occupations important?

- OD Duncan: “the single best indicator of social status”.
- EO Wright: “Sociology’s core variable”.
- RM Hauser: “Occupational status is the better version of the economist’s ‘permanent income’ concept”.
- Occupations are important as dependent variables (occupational attainment studies) and independent variables (occupation stratification studies) in educational (and occupational!) status attainment, health, voting, consumption, marriage etc.

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Occupations: what are they?

- Combination of work tasks and duties that is transferable across work establishments.
- Occupation is related but NOT identical to:
 - Job
 - Firm / work organization
 - Industry
 - Education / Qualification
 - Salary grade
 - Employment contract (e.g. indefinite-fixed term, self-employed-salaried).

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Complicated and multi-faceted

- Common descriptions of occupation refer to multiple elements like:
 - Set of required skills and competencies
 - Responsibility, authority
 - Autonomy
 - Status in employment.
- And respondents tend to talk about quite a but more...

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Question format -- open

- Because occupations are complicated, it is often advised to collect the information in an open format.
- Underlying assumption is that no set of closed questions can sufficiently measure the required details.
- Questions usually have two elements:
 - Job title
 - Describe major duties and tasks
- This information is recorded *verbatim* and then post-processed (coded in the office). This implies that measuring occupations is a lot of work and that many things can go wrong.

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Occupations in PIAAC

- Resp's current / last occupation:
 - Job title
 - Most important responsibilities
 - Kind of business, industry or service
 - What does your firm/organization make or do?
 - Sector of the economy (private..public)
 - Employee / self-employed
 - Firm/organization size
 - Number of subordinates

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Father's / Mother's occupation

- Father's / mother's occupation:
 - Job title
 - Kind of work
- NOT:
 - Self-employment
 - Supervisory status

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A first look at ISCO-08

- Hierarchical digit system:
 - Major groups
 - Sub-major groups
 - Minor groups
 - Unit groups
- ISEI-08 (as estimate on ISSP 2002-2007)
 - This is a provisional scale that was generated using a straight conversion from ISCO-88 data.
 - Some imputation using ISEI-68 data.

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Occupational status

- Occupations / occupation codes are not directly used in statistical analysis
- They enter statistical analysis as occupational status measures:
 - Sociologically meaningful indicators of hierarchical position in society.
 - There exist several (internationally comparative) occupational status measures, each with different theoretical backgrounds and applications.

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Occupational status measures (1)

- Continuous indicators:
 - Prestige (*subjective*): popular evaluation of attractiveness of occupations.
 - Socio-economic index [SEI] (*objective*): scaling of occupations by criterion variables in the status attainment process.
- Discrete indicators:
 - Socio-economic classes (*apriori*): categories organized by common work and contract situation.

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Comparative occupational status measures

- SIOPS: Standardized International Occupation Prestige Scale (Treiman): harmonization of some 60 national prestige scales.
- ISEI: International Socio-Economic Index of occupational status (Ganzeboom & Treiman): constructed on large harmonized international data files that contains comparable indicators of occupations, education, earnings.

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ISEI – a MIMIC model

EDUCATION → OCCUPATION → INCOME



ISEI is defined as the scaling of detailed occupations that *maximizes* the *indirect* effect of education on income and *minimizes* the *direct* effect.

→ ISEI measures how occupations transfer education into earnings.

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Socio-economic classes

- EGP (Erikson-Goldthorpe-Portocarero) organizes occupational positions into 11 discrete categories.
- For EU: ESEC (European Socio-Economic Classes) distinguishes 9 discrete categories.
- Socio-economic classes draw as much on (A) occupations, as on (B) status in employment (self-employment, supervising status).
- ✘ EGP/ESEC cannot be defined on father and mother for PISAAC data, because status-in-employment is not collected.

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Why socio-economic classes?

- Some researchers like discrete measures better than continuous ones...
- Some theories see occupational stratification as an intrinsically discrete structure, that is more defined by *boundaries* than by *distance*.
- There is an enormous amount of evidence that intergenerational occupational reproduction / mobility is a process that cannot be sufficiently captured by a single parameter (such as an OLS regression coefficient).

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A problem ...

- While there is a new occupational classification (ISCO-08) available, we do not have (yet) occupational status measures for it.
- Not easy to solve for ISEI: we need data coded in ISCO-08 to construct ISEI and it is not attractive to use this classification because there no ISEI yet.
- Other measures (SIOPS, EGP/ESEC) can be constructed without ISCO-08 data, but need such data for validation.

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The solution ...

- I have created a new (but provisional) ISEI-08, using data from the ISSP 2002-2007 (N=198000, 45 countries) and a straight recode of ISCO-88 → ISCO-08,
- Also, an ISEC-08 (socio-economic classes) and SIOPS-08 (prestige) will become available soon.
- Note that in PISAAC ISEC-08 is useful for respondents, but not for fathers and mothers.

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ISCO-08: Structure and pitfalls

ISCO in the past

- The International Standard Classification of Occupation [ISCO] has been revised recently into a fourth edition: 1958, 1968, 1988 and now 2008.
- Stratification researchers (and survey researchers in general) have used the 1968 version extensively (e.g. Political Action 1974 study, the Treiman SIOPS scale, various national classifications are derived from it).
- ISCO-88 has become the de-facto standard for classifying occupations in international survey projects (ESS, ISSP, SHARE, PISA, IALS etc.)

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Stated goals of ISCO-08

- Bring occupational classification in line with changed technologies and division of labor (e.g. ICT/IT).
- Make ISCO applicable in a wider range of countries and economies.
- To mend often noted problems with the application of ISCO-88.
- To produce a *minor* revision, not a totally different classification.

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General principle 1: four hierarchical digits

- ISCO is organized in four nested hierarchical levels:
 - Major groups 2 2000
 - Sub-major groups 21 2100
 - Minor groups 217 2170
 - Unit groups 2174 2174
- Note that I use the convention to add trailing zeroes (ISCO itself does not do this). This is particularly important when you allow coding at a variable level of precision.
- The aim is to group occupations within digit level by degree of similarity.

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General principle 2: skill levels

- Occupational classifications generally are a mix of three dimensions:
 - Skill level
 - Product, industry
 - Status in employment (self-employment, supervising).
- ISCO chooses skill levels as the primary dimension and seeks to avoid status-in-employment.
- (The argument is that status-in-employment should be separately measured from occupation.)

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State of revision

- ISCO-08 has been decided upon in December 6th 2007.
- What is on the ILO website as of January 2010:
 - No manual!!
 - Draft definitions of all groups
 - Many-to-many conversions between ISCO-88 and ISCO-08 (both directions), listing all mergers and splits.

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ISCO-08 versus ISCO-88

ISCO-08 groups

- 10 major
- 34 sub-major
- 120 minor
- 403 unit

Total: 567 groups

ISCO-88 groups

- 9/10 major
- 28 sub-major
- 115 minor
- 363 unit

Total 516 groups

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Mergers and Splits

- Mergers: Many-to-one recodes.
- Splits: One-to-many recodes.
- Mergers & splits: Many-to-many recodes.
- All of these occur when comparing ISCO-88 to ISCO-08.
- When we crosswalk from 88 to 08 (and have no further information), only mergers are relevant.
- But when we have ISCO-88 and further information (like original verbatim info or original source classification), we also need to consider splits.

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Mergers

Table X2: Number of mergers that occurred to occupation codes when transferring ISCO-88 into ISCO-08, by number of digits of ISCO-08.

DIGIT08	MERGER							Total
	1	2	3	4	5	5+		
1	10							10
2	30	4						34
3	105	14	1					120
4	317	64	13	5	2	2		403
Total	462	82	14	5	2	2		567

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Splits

Table X1: Number of splits that occurred to occupation codes when transferring ISCO-88 into ISCO-08, by number of digits of ISCO-88.

DIGIT88	SPLITS							Total
	1	2	3	4	5	5+		
1	10							10
2	24	1	3					28
3	92	14	7	1			1	115
4	274	56	21	4	1	7		363
Total	400	71	31	5	1	8		516

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A closer look at ISCO-08

- By 10 Major group (in Yellow)
- By 34 Sub-major group (in Brown)
- By some problematic groups (marked RED)

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Major groups (1-digit)

- 10 major groups: Essentially unchanged, with small changes of titles.
- However: If minor groups have been shifted between major groups (see below), this *de facto* changes major groups too!
- The major group that is likely most affected by such shifts is (5000) and in particular (5200) Sales Workers, that now contains a number of Elementary Sales Occupations (formerly 9000), as well as Shop Keepers (formerly 1000).

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Sub-major groups (2 digits)

- 34 sub-major groups: expanded from 28 major groups.
- Truly NEW:
 - (0100, 0200, 0300) Army ranks (3x)
 - (9400) Food Preparation Workers
- Other 'new' major groups are 'upgraded' or 'merged' minor groups. Roughly speaking, about half of the sub-major groups has remained the same, the other half has a different composition than in 1988.

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ICT occupations

- Altogether, ISCO-08 distinguishes ca. 20 ICT occupations, that occur at several levels:
 - (2500) ICT Professionals (11x)
 - (3500) ICT Technicians (5x)
 - (1330) ICT Service Manager (1x)
 - (2356) ICT Teachers (1x)
 - (2434) ICT Sales Professionals (1x)
- Neither (2500) nor (3500) are new – actually both existed already in ISCO-68 (as minor groups)!

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Main problems with ISCO-88

1. Alignment of ISCO and ISCED skill levels was imperfect.
2. Status-in-employment is not taken into account, whereas respondent often refer to it (sometimes as the only element).
3. The distinction between groups of managers is impractical.
4. Self-employed farmers can be coded in several places.
5. Very little differentiation in sales and service occupations.
6. It is hard to code crude answers such as "factory worker".

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Problem 1: Imperfect skill orientation

- Some ambiguities between (7000) Craft Workers, and (8000) Machine Operators have been removed.
- An NEW feature is the distinction between (8100) Stationary Machine Operators, and (3130) Process Control Technicians, which probably refers to the complexity of the process / machine controlled / operated.

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Problem 2: Employment status

- Although somewhat indirect, ISCO-08 has better fitting codes for Large Entrepreneurs (1120) and Manual Foreman (3120).
- There remains an ambiguous distinction between (1420) Retail and Wholesale Trade Managers, and (5221) Shop Keepers.

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Problem 3: Managers

- The implicit reference to firm size (i.e. number of departments) has disappeared, the same things are now referred to by main activity.
- At the sub-major group level Corporate Managers are now longer grouped with department managers, but with (high) Government Officials.
- Major changes occur at the 3-digit and 4 digit level.
 - (1330) ICT Services Managers
 - (1340) Professional Services Managers (9x)

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Problem 4: Farmers

- Self-employed farmers can still be coded in as (1310) Managers in Agriculture etc. However, this is exclusively mean for production managers in large farms.
- It remains possible to code them with (6100) Market-oriented Skilled Agricultural Workers.
- Interestingly, a NEW feature is that (6200) Subsistence Farmers has now four minor groups.

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Problem 5: Crude Sales / Service

- Sales salespersons are split:
 - (5221) Shop Keepers
 - (5222) Shop Supervisors
 - (5223) Shop Sales AssistantsThis is an improvement, but also a problem.
- Also, more levels and locations of sales (market, stall, cashiers) have been regrouped in the sub-major group (5200).
This has made the sub-major group even more heterogeneous than it was.

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Interesting ..

- Cooks are now split up into
 - (3434) Chef [a “Culinary Associate Professional”]
 - (5120) Cooks
 - (9400) Food Preparation Workers
 - (9411) Fast Food Preparers
 - (9412) Kitchen Helper
- I am very happy with this...

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Problem 6: Crude occupations

- Some of the new features mend this problem:
 - “Foreman” can now be classified as (3120) Production Supervisor.
 - “Shop keeper” can go in two places.
 - “Skilled Worker” can be more conveniently coded as (7000).

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Interesting ...

- Specialized Secretaries and Office Managers are now in (3000) Associate Professionals.
- Some new (!) occupations:
 - (2230) Traditional and Complementary Health Professional
 - (5245) Service Station Attendant
 - (7234) Bicycle Repairman
 - (9334) Shelf Filler
 - (9412) Kitchen Helper
- Disappeared:
 - (2121) Mathematician, Statistician
 - (6142) Charcoal Burner

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How many digits?

- PIAAC requires project members
 - To code four digits,
 - To deliver two digits.
- How important is detail?
 - Using ISEI, we can estimate the loss of precision using explained variance:

• 4 digits:	100%
• 3 digits:	95%
• 2 digits:	90%
• 1 digit:	82%
- The most important message here is: get the first two digits right!
- By now you should know: you cannot code the first two digits without considering the last two!

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How can we reclassify existing ISCO-88 data into ISCO-08?

- A simple conversion of ISCO-88 into ISCO-08 is not possible without loss of information.
- The SPSS recode **ISCO8808.sps** does two things at the same time:
 - Straight recode of ISCO-88 into ISCO-08 ('best fit'). Truncate trailing decimals, if this is the only thing that you want or can do.
 - Trailing decimals suggest the amount of alternatives (splits). You will have to consult a separate document to find the options. For this to be useful you will need original strings or classifications.

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How was ISEI-08 constructed?

- Large dataset (ISSP 2002-2007, 45 countries, N=198000) with detailed ISCO-88 codes.
- Straight recode (best fitting target) into ISCO-08.
- Harmonize education and (personal) income within each study (ISSP round * country).
- ISEI-08 constructed at the most detailed level (unless N<21).
- If no ISEI score could be found for a certain group:
 - Borrow from the next up hierarchical level
 - Borrow from ISEI-68 (!) when applicable.

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How will SIOPS-08 be constructed?

- SIOPS was generated by Treiman (1977) using ISCO-68 as a backbone.
- Treiman averaged some 60 national prestige scales.
- In order to generalize this to ISCO-08, I will create a straight ISCO-68 → ISCO-08 conversion, using the most dominant destination code.
- Given the distance between the two occupational classifications, it need to be seen (in double coded data) how well this works.

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Socio-economic classes

- For socio-economic classes we have two competing schemes:
 - EGP (11 categories)
 - ESEC (9 categories)
- Both combine occupation codes with status in employment.
- Main differences between ESEC and EGP:
 - ESEC merges farm laborers with unskilled labor
 - ESEC merges high skilled manual labor with manual supervisors.

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Creating ISEC-08

- ISEC-08 will contain 13 categories of which both EGP and ESEC are special cases (recode).
- Developing this will be done on ISCO-88 data (ISSP) and be validated on ESS data.

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Validity checks

- Validity checks can currently only be done at data that are 'upgraded' from ISCO-88 to ISCO-08. Checks were run on ESS 2002-2008 (four rounds).
- ISEI-08 represents status attainment structure in ESS better than the existing ISEI-88 (0.98 versus 0.94 as measurement loadings).
- Reason for improvement:
 - Use of larger and more 'representative' data source.
 - Construction on men and women (previously only men).

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Resources

- ILO [website](#):
 - ISCO-08 Classification
 - Many-to-many conversions ISCO-88 ↔ ISCO-08
 - (Draft) Definitions
 - Discussion on draft definition
 - Information on ISCO-58, ISCO-68, ISCO-88.
- HG [website](#):
 - ISCO-08 Classification with ISEI
 - SPSS label files
 - Many to one conversion ISCO-88 ↔ ISCO-08
 - ISCO-08 → ISEI-08 (SIOPS-08, ISEC-08)
 - Q&A on ISCO-08, ISEI-08, ISEC-08
 - Similar on ISCO-68 and ISCO-88.
 - Link to translation of ISCO-08 to translation in 29 EU languages.