Occupation Coding using ISCO-08

Training session for PIAAC

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Free University Amsterdam
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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-08
   Break: Please submit questions!
3. Questions and Answers
4. Do’s and Don’t’s of Occupation Coding

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.

Occupations and Occupational Status

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).

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...
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.

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

Father’s / Mother’s occupation

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

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.

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.

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.
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.

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.

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.

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).

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.

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.
ISCO-08:
Structure and pitfalls

ISCO in the past
• 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.)

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.

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.

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-employent should be separately measured from occupation.)

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.
ISCO-08 versus ISCO-88

<table>
<thead>
<tr>
<th>ISCO-08 groups</th>
<th>ISCO-88 groups</th>
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<tbody>
<tr>
<td>• 10 major</td>
<td>• 9/10 major</td>
</tr>
<tr>
<td>• 34 sub-major</td>
<td>• 28 sub-major</td>
</tr>
<tr>
<td>• 120 minor</td>
<td>• 115 minor</td>
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<tr>
<td>• 403 unit</td>
<td>• 363 unit</td>
</tr>
<tr>
<td>Total: 567 groups</td>
<td>Total 516 groups</td>
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</table>

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.

Mergers

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<th>40</th>
<th>50</th>
<th>5+</th>
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<td>14</td>
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Splits

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<th>40</th>
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<td>31</td>
<td>5</td>
<td>1</td>
<td>8</td>
<td>516</td>
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</tbody>
</table>

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)

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).
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.

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!)

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”.

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.

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.

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)
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.

Problem 5: Crude Sales / Service

- Sales salespersons are split:
  - (5221) Shop Keepers
  - (5222) Shop Supervisors
  - (5223) Shop Sales Assistants
  This 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.

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...

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 Worked” can be more conveniently coded as (7000).

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

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!
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.

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.

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.

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.

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.

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).
Resources

- **ILC website**
  - ISCO-08 Classification
  - Many-to-many conversion ISCO-08 <-> 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-88 and ISCO-08.
  - Link to translation of ISCO-08 to translation in 29 EU languages.