



EUROPEAN COMMISSION
EUROSTAT

Directorate F: Social statistics
Unit F-3: Labour market statistics and lifelong learning

Anonymisation method applied on SES microdata

-SES 2018 update-

Further to the work of a dedicated Task Force on 'Enterprise microdata anonymisation' set up by the Statistical Confidentiality Committee in 2007, generic solutions have been proposed for the anonymisation of enterprise data. On this basis, Eurostat commissioned a study to analyse how these general rules could be adapted to SES 2002 and SES 2006 data. The final report including a set of detailed anonymisation criteria was released in early 2008 and used as a basis to anonymise SES 2002 and SES 2006 data (see: Anonymisation of SES Microdata – Final document; J. Domingo-Ferrer and J. M. Mateo-Sanz, March 2008 in LAMAS document 5.2 of Eurostat/F2/LAMAS/36/08¹).

General rules applied in anonymisation of SES (all vintages) microdata are as follows:

- ✓ Recodifying the categorical quasi-identifiers NACE, NUTS and SIZE of the enterprise in order to yield ratios between the number of sensitive combinations NACE-NUTS-SIZE (defined as those for which less than 3 enterprises exist in the member state's samples) and the total number of combinations in the SES lower than the threshold of 10% in a high majority of cases. The resulting codification mixes NACE sections, sub-sections or divisions and NUTS 0 or 1 levels as well as a maximum of 3 size classes (<50, 50 to 249 and 250+), depending on Member States;
- ✓ Removing Citizenship and performing global recoding on the age variable (2.2) to restrict its values to six intervals 14-19, 20-29, 30-39, 40-49, 50-59, 60+;
- ✓ Ensuring an additional protection of employees using unconstrained individual ranking micro-aggregation for SES metric variables (absence days and earnings) by groups of (at least) 3 employees. This means that the latter variables are averaged for categories/combinations that include less than 3 employees in order to hide the information relating to individuals – variables for which micro-aggregation is applied are:

Variable code	Variable label
B33	Annual days of holiday leave (in full days)
B34	Other annual days of paid absence
B41	Gross annual earnings in the reference year
B411	Annual Bonuses and allowances not paid at each pay period
B42	Gross earnings in reference month
B421	Earnings related to overtime
B422	Special payments for shift work
B43	Average gross hourly earnings in the reference month <i>(to 2 decimal places)</i>

- ✓ Suppressing the grossing-up factor for local units and removing KEY_B identifying the enterprise.

In addition, further anonymisation has been applied for some Member States (see Annex 1). This methodology ensures both the anonymisation of employees and local unit data.

¹ https://circabc.europa.eu/sd/d/05e00334-77ac-435c-9deb-61a841fd7c08/LAMAS_36_08_ITEM_5%202020Anonymisation%20SES%20microdata.pdf

Following countries used their own national anonymisation methods (as described in document attached to each respective country anonymised microdata):

- ✓ the Netherlands – for SES 2002 and 2006
- ✓ Germany – for SES 2006, 2010, 2014 and 2018
- ✓ Italy – for SES 2002, 2006 and 2010
- ✓ Latvia – for SES 2014
- ✓ Spain – for SES 2018

SES 2014 update

In the case of SES 2014 data, Eurostat took the option of minimizing the changes in the anonymisation methodology, as it was also the case for SES 2010 data. The aim was to reach consensus among Member States and facilitate the joint use of 2002, 2006, 2010 and 2014 data by researchers wanting to make time comparisons.

However, it was necessary to adapt the methodology with respect to NACE recoding in order to accommodate the shift from NACE Rev. 1 that was used for SES 2002 and SES 2006, to NACE Rev. 2 used for SES 2010. There again, it was chosen to remain as consistent as possible with the NACE regroupings used in previous waves in order to facilitate comparisons over time.

The table in Annex 2 shows how NACE sections have been grouped into aggregates in the case of NACE-rev1 and NACE-rev2.

SES 2018 update

As agreed at October 2020 Labour Market Statistics working group meeting Eurostat applied the same anonymization methodology on SES 2018 data as for SES 2014.

ANNEX 1

Additional country-specific rules used for the anonymisation of SES microdata

1) All countries:

- ✓ Remove KEY_B
- ✓ Remove A41 (A51)

- ✓ A12 (SIZE): CY, LU and MT = All
EE (All, <50 and 50+)

2) BE:

- ✓ ISCO 2 digits only (B23)
- ✓ Length of service in the enterprise (B26) if more than 40 then B26=40+
- ✓ Number of employees in local unit (A16) = missing
- ✓ For those cases NUTS x NACE x SIZE with less than 3 local units A12 recoded to 4 4; consequently A12_class is recoded with ALL
- ✓ For economic and financial control (A14), have it missing for local units of enterprises GT_250 in economic activities (A13) where there is less than 3 enterprises with public control (A14 = A)
- ✓ For some NACE groups (B_35_to_36, 16_to_18_58_to_60, 53_61_to_63_79 and 64_to_66_69_80) , A14 = missing.

3) BG:

- ✓ NUTS (All) = BG (no region) for SES 2002
- ✓ For some specific combinations of NACE x Economic Control x SIZE x NUTS, then anonymise SIZE (A12) = '3' or '4' and NUTS (A11) = BG and/or Economic Control (A14) = missing
- ✓ A16 (optional variable) to be deleted

4) DK:

- ✓ Following aggregations of NACE groups (A13):
 - NACE Rev.2: 10_to_13
 - NACE Rev.2: 14_to_17

4) EE:

- ✓ Following aggregations of NACE groups (A13):
 - NACE Rev.2: 19_20_22 + 21
- ✓ For economic activity NACE 64 remove the value of variable A14

5) ES:

- ✓ For those cases NUTS x NACE x SIZE with less than 3 local units then replace by NUTS x NACE x [SIZE (A12) = 4 (all)]
- ✓ For some specific combinations of NACE x NUTS, then anonymise SIZE (A12) = 'ALL'

6) EL:

- ✓ For those cases where NUTS = 'EL3' or 'EL4' replace by All = 'ELX' and NUTS = 'EL5' or 'EL6' replace by All = 'ELZ'

7) MT:

- ✓ Following aggregations of NACE groups (A13):
 - C+E (NACE Rev.2: B_35_36)
 - DM+DN (NACE Rev.2: 29_to_32)
 - 20+21+22 (NACE Rev.2: 16_to_18_58_to_60)
 - 30+31+32+33 (NACE Rev.2: 21_26_27_33)

8) LU:

- ✓ Following aggregations of NACE groups (A13):
 - C+E (NACE Rev.2: B_35_36)
 - DM+DN (NACE Rev.2: 29_to_32)
 - 20+21+22 (NACE Rev.2: 16_to_18_58_to_60)
 - 30+31+32+33 (NACE Rev.2: 21_26_27_33)
- ✓ Remove KEY_L
- ✓ Remove A14
- ✓ Recode A15 into Yes/No
- ✓ A17 (affiliation to a group) to be deleted
- ✓ 2002 only : A18 and A19 to be deleted

9) LV:

- ✓ Following aggregations of NACE groups (A13):
 - 17+18+19 (NACE Rev.2: 13_to_15)
 - DF+DG+DH+DI (NACE Rev.2.: 19_20_22)
 - 33+DM (NACE Rev.2: 21_26_27_33)
 - DJ+DK (NACE Rev.2; 24_25)

10) PT:

- ✓ Following aggregations of NACE groups (A13):
 - C+E (NACE Rev.2: B_35_36)
 - 30+31+32+33 (NACE Rev.2: 21_26_27_33)
- ✓ NUTS (A11) = PT (no region)
- ✓ ISCO 2 digits only (B23)
- ✓ Length of service in the enterprise (B26) in 3 groups < 35, 35-39, 40+
- ✓ Micro-aggregation: no change

11) FI:

- ✓ Remove KEY_L
- ✓ ISCO 2 digits only
- ✓ NUTS (All) = FI (no region)

12) HR:

- ✓ Following aggregations of NACE groups (A13):
 - C+E (NACE Rev.2: B_35_36)
 - DM+DN (NACE Rev.2: 29_to_32)
 - 20+21+22 (NACE Rev.2: 16_to_18_58_to_60)
 - 30+31+32+33 (NACE Rev.2: 21_26_27_33)

13) MK:

- ✓ Following aggregations of NACE groups (A13):
 - C+E (NACE Rev.2: B_35_36)
 - DM+DN (NACE Rev.2: 29_to_32)
 - 20+21+22 (NACE Rev.2: 16_to_18_58_to_60)
 - 30+31+32+33 (NACE Rev.2: 21_26_27_33)
- ✓ A12 (SIZE) = All

14) NO:

- ✓ Delete information in variable (A13) for all sensitive combinations.

15) SI:

- ✓ Remove KEY_L
- ✓ B26: top coding at including 40+; all employees have 40+
- ✓ B32: top coding for 300 or more: calculate an average of employees >= 300; all employees >= 300 have the same calculated average
- ✓ B321: top coding for 120 or more: calculate an average of employees >= 120; all employees >= 120 have the same calculated average
- ✓ B41: top coding above EUR 200,000; calculate an average of employees above EUR 200,000; all employees above EUR 200,000 have the same calculated average
- ✓ B411 top coding above EUR 50,000; calculate an average of employees above EUR 50,000; all employees above EUR 50,000 have the same calculated average
- ✓ B42 top coding above EUR 14,000; calculate an average of employees above EUR 14,000; all employees above EUR 14,000 have the same calculated average
- ✓ B421 top coding above EUR 2,500; calculate an average of employees above EUR 2,500; all employees above EUR 2,500 have the same calculated average
- ✓ B422 top coding above EUR 2,000; calculate an average of employees above EUR 2,000; all employees above EUR 2,000 have the same calculated average
- ✓ B43 must be recalculated based on above mentioned rules for B42 and B32 (B43 = B42/B32)
- ✓ Following aggregations of NACE groups (A13):

NACE Rev.2: C10 to C13	10_to_13
NACE Rev.2: C14 + C15	14_15
NACE Rev.2: C16 to C18 + J58 to J60 + C21 + C26 + C27 + C33	16_to_18_58_to_60_21_26_27_33
NACE Rev.2: C19 + C20 + C22	19_20_22
NACE Rev.2: C23 to C25	23_to_25
NACE Rev.2: C28	28
NACE Rev.2: C29 to C32	29_to_32
NACE Rev.2: E37 to E39	37_to_39
NACE Rev.2: G45 + G46	45_46
NACE Rev.2: G47	47
NACE Rev.2: H49 to H52	49_to_52
NACE Rev.2: H53 + J61 to J63 + N79	53_61_to_63_79

NACE Rev.2: K + M69 + N80	64_to_66_69_80
NACE Rev.2: L + M72 to M74 + N77 + S95	68_72_to_74_77_95
NACE Rev.2: M70 + M71 + N78 + N81 + N82	70_71_78_81_82
NACE Rev.2: M75 + Q	75_86_to_88
NACE Rev.2: R + S96	90_to_93_96
NACE Rev.2: S94	94
NACE Rev.2: B + D + E36	B_35_36
NACE Rev.2: F	F
NACE Rev.2: I	I
NACE Rev.2: O	O
NACE Rev.2: P	P

16) IS:

- ✓ Remove KEY_L
- ✓ Remove A16

ANNEX 2: Codification of SES in NACE Rev. 1.1 (2002 and 2006) and NACE Rev. 2 (2010 and 2014)

NACE REV.1.1 (2-digit)	Rev.1.1 recoding	Rev. 2 recoding	NACE REV.2 (2-digit)
10 Mining of coal and lignite; extraction of peat service activities incidental to oil and gas extraction, excluding surveying	C	B	5 Mining of coal and lignite
12 Mining of uranium and thorium ores			6 Extraction of crude petroleum and natural gas
13 Mining of metal ores			-
14 Other mining and quarrying			7 Mining of metal ores
-			8 Other mining and quarrying
15 Manufacture of food products and beverages	DA	10_to_12	9 Mining support service activities
-			10 Manufacture of food products
16 Manufacture of tobacco products			11 Manufacture of beverages
17 Manufacture of textiles	17	13	12 Manufacture of tobacco products
18 Manufacture of wearing apparel; dressing and dyeing of fur	18,19	14_to_15	13 Manufacture of textiles
19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear			14 Manufacture of wearing apparel
20 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials			15 Manufacture of leather and related products
21 Manufacture of pulp, paper and paper products	20,21	16_to_17	16 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
22 Publishing, printing and reproduction of recorded media	22	18_58_to_60	17 Manufacture of paper and paper products
-			18 Printing and reproduction of recorded media
-			58 Publishing activities
23 Manufacture of coke, refined petroleum products and nuclear fuel	DF, DG, DH	19_20_22	59 Motion picture, video and television programme production, sound recording and music publishing activities
24 Manufacture of chemicals and chemical products			60 Programming and broadcasting activities
25 Manufacture of rubber and plastic products			19 Manufacture of coke and refined petroleum products
26 Manufacture of other non-metallic mineral products	DI	23	20 Manufacture of chemicals and chemical products
27 Manufacture of basic metals	DJ	24_to_25	22 Manufacture of rubber and plastic products
28 Manufacture of fabricated metal products, except machinery and equipment			23 Manufacture of other non-metallic mineral products
29 Manufacture of machinery and equipment not elsewhere classified (n.e.c)			24 Manufacture of basic metals
30 Manufacture of office machinery and computers	DK	28	25 Manufacture of fabricated metal products, except machinery and equipment
31 Manufacture of electrical machinery and apparatus n.e.c.			28 Manufacture of machinery and equipment n.e.c.
32 Manufacture of radio, television and communication equipment and apparatus			26 Manufacture of computer, electronic, optical products
33 Manufacture of medical, precision and optical instruments, watches and clocks			27 Manufacture of electrical equipment
34 Manufacture of motor vehicles, trailers/semi-trailers	30,31,32	26_to_27_33	33 Repair and installation of machinery and equipment
35 Manufacture of other transport equipment			21 Manufacture of basic pharmaceutical products and pharmaceutical preparations
36 Manufacture of furniture; manufacturing n.e.c.	33	21	29 Manufacture of motor vehicles, trailers / semi-trailers
37 Recycling			30 Manufacture of other transport equipment
40 Electricity, gas, steam and hot water supply	DM	29_to_30	31 Manufacture of furniture
41 Collection, purification and distribution of water			32 Other manufacturing
	DN	31_to_32	35 Electricity, gas, steam and air conditioning supply
			36 Water collection, treatment and supply
	E	35_to_36	

45 Construction			41 Construction of buildings
-			42 Civil engineering
-	F	F	43 Specialised construction activities
50 Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel			45 Wholesale and retail trade and repair of motor vehicles and motorcycles
51 Wholesale trade and commission trade, except of motor vehicles and motorcycles	50,51	45_to_46	46 Wholesale trade, except of motor vehicles and motorcycles
52 Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	52	47	47 Retail trade, except of motor vehicles and motorcycles
55 Hotels and restaurants			55 Accommodation
-	H	I	56 Food and beverage service activities
60 Land transport; transport via pipelines			49 Land transport and transport via pipelines
61 Water transport			50 Water transport
62 Air transport			51 Air transport
-	60,61,62	49_to_52	52 Warehousing and support activities for transportation
63 Supporting and auxiliary transport activities; activities of travel agencies			79 Travel agency, tour operator and other reservation service and related activities
64 Post and telecommunications			53 Postal and courier activities
-			61 Telecommunications
-			62 Computer programming, consultancy and related activities
-	63,64	53_61_to_63_79	63 Information service activities
65 Financial intermediation, except insurance and pension funding			64 Financial service activities, except insurance and pension funding
66 Insurance and pension funding, except compulsory social security			65 Insurance, reinsurance and pension funding, except compulsory social security
67 Activities auxiliary to financial intermediation			66 Activities auxiliary to financial services and insurance activities
-		64_to_66_69	69 Legal and accounting activities
70 Real estate activities			68 Real estate activities
71 Renting of machinery and equipment without operator and of personal and household goods			77 Rental and leasing activities
72 Computer and related activities			72 Scientific research and development
73 Research and development	70,71,72,73	68_72_to_74_77	73 Advertising and market research
-			74 Other professional, scientific and technical activities
74 Other business activities			70 Activities of head offices; management consultancy activities
-			71 Architectural and engineering activities; technical testing and analysis
-			78 Employment activities
-			80 Security and investigation activities
-	74	70_to_71_78_80_to_82	81 Services to buildings and landscape activities
-			82 Office administrative, office support and other business support activities
75 Public administration and defence; compulsory social security	L	O	84 Public administration and defence; compulsory social security
80 Education	M	P	85 Education
85 Health and social work			86 Human health activities
-			87 Residential care activities
-	N	86_to_88_75	88 Social work activities without accommodation
-			75 Veterinary activities
90 Sewage and refuse disposal, sanitation and similar activities			37 Sewerage
-			38 Waste collection, treatment and disposal activities; materials recovery
-	90	37_to_39	39 Remediation activities and other waste management services
91 Activities of membership organizations n.e.c.	91	94	94 Activities of membership organisations
92 Recreational, cultural and sporting activities			90 Creative, arts and entertainment activities
93 Other service activities			91 Libraries, archives, museums, other cultural activities
-			92 Gambling and betting activities
-			93 Sports activities, amusement and recreation activities
-	92,93	90_to_93_95_to_96	95 Repair of computers and personal and household goods
-			96 Other personal service activities