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IMPUTATION OF INCOME IN THE ECHP

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Abbreviations used in this document:	
i	current wave
i-x	last wave for which information is available
i-1	previous wave
P0iNNNN, H0iNNNN	variables corresponding to the ECHP questionnaires from wave 3 onwards [i = wave number, NNNN number of the variable] (see codebook and list of variables); for wave 2 variable names are shorter, i.e. the last position of variable name has to be ignored; for wave 1 the variable names are different.
PXNNN, HXNNN	Variables corresponding to the ECHP UDB, X=character, NNN number of the variable (see ECHP UDB, description of variables)
P_NG	Net/gross ratio for previous year
C_NG_A	Net/gross ratio for current year - persons working 15 hours or more per week
C_NG_B	Net/gross ratio for current year - persons working less than 15 hours per week

1. INTRODUCTION

Income information is collected very detailed in the ECHP questionnaire. Some of the income components are collected at household level, others are collected for each individual in the household. This information was, however, not collected to be analysed as such, but to provide a basis for income aggregates which are comparable across countries.

In order to provide comparable figures for income components, missing answers to some questions (i.e. item non-response) have to be imputed. Chapters 2 to 4 deal with this question. Chapter 2 describes the structure of the income questions in the ECHP and the basic ideas used for the imputation. Chapter 3 contains a description of the algorithm. How the imputation works for the individual components is described in chapter 4.

Some income components are collected net, others gross of taxes. In order to derive net values for all the components, a net/gross ratio for each household has to be estimated. This algorithm is described in chapter 5.

Furthermore, in order to have comparable figures at aggregated household level, it is necessary to make up for unit non-response if no questionnaire was answered by some persons in the household. Chapter 6 describes how this problem is dealt with.

Some income components are collected at household level, others at personal level. In order to have complete information at both levels, household income components are shared among all the persons (see chapter 8) and personal income is aggregated for the whole household (see chapter 7). Chapter 9 describes how imputation indexes are calculated, and chapter 10 how the algorithm is adapted to be applied to the initial wave.

2. THE PROBLEM

The questionnaires are structured by income components (e.g. capital income, unemployment related benefits). For some components, detailed sub-components are collected (e.g. unemployment insurance benefit, unemployment assistance, etc.).

The questionnaires are designed in such a way that the number of questions asked to individuals should be limited and that no unnecessary questions be asked. This has been taken care of by making extensive use of routing.

2.1. Types of questions

Different types of questions are asked to collect the amount of a specific income component. Basically, the structure is as follows for each component:

Initial question (Filter A): 'Did you receive any income from this component?'

If the answer is 'yes', then the person is asked more detailed questions for each sub-component, like:

'Did you receive sub-component 1?' (Filter B)

-> if yes, 'please give average monthly amount or lumpsum, both net and gross' -> 'Number of months received' (1 to 14, 97 if lumpsum)

OR

-> if yes, 'please give average monthly amount or lumpsum' -> 'Number of months received' (1 to 14, 97 if lumpsum)

OR

-> if yes, 'How much did you receive during the course of (year)?'

OR

-> if yes, 'Do you know the amount?', if yes, 'Please give amount', if no, 'Perhaps you could give the approximate range?'

OR

-> if yes, 'Do you know the amount?', if yes, 'Please give amount' and 'Is this amount gross or net?'

If the answer to the Filter B is 'no' or 'missing', then Filter B for the next sub-component is asked.

If the answer to Filter A (initial question) is 'no' or 'missing', then Filter A for the next component is asked.

2.2. The following items may be missing:

The answer to Filter A

The answer to Filter B

The information on number of months

The monthly amount, but the annual amount is given

The annual amount, but the monthly amount is given

The net amount, but the gross amount is given

The gross amount, but the net amount is given

The amount, but the approximate range is known

The amount and the approximate range

The amount

The information on whether gross or net

2.3. How does the imputation work in the different situations?

The basic principles for imputation are described in this section; they are illustrated with some examples. For detailed algorithms see chapter 3.

2.3.1. The answer to Filter A is missing (code 9)

Usually this is considered as 'no'. Only in one case, namely 'income as an employee', the calendar of activities is checked. If a person has been in paid employment or apprenticeship at least one month in the previous year the answer to 'did you receive any income as an employee?' is set to 'yes'.

2.3.2. The answer to Filter B is missing (code 9)

For most sub-components, a Filter B question is asked. Depending on component specific rules, some of these may be set to 'yes' based on other information collected during the interview. (e.g. if a person has been unemployed for at least one month in the previous year, only the first four sub-components are set to 'yes', while Filter B for the last sub-component is set to 'no' - another example: if there are children below 16 in the household, a missing answer to the question on whether family related allowances are obtained is replaced by 'yes', otherwise it is set to 'no').

If the answer is changed from 'missing' into 'yes', then for subsequent questions that were not asked due to routing, '.' are replaced by missing codes (99 for number of months, 99999999 for amounts).

2.3.3. The number of months is missing (code 99)

Number of months are imputed in two steps. Mainly the calendar of activities is used (e.g. if a person had been unemployed during 3 months and the number of months corresponding to unemployment related benefits are missing, then it is set to 3). For

those persons with missing calendar information, or for variables that are not related to activities (e.g. deserted wife's allowance), the number of months is imputed by applying a random number of months - based on the distribution for responses (including imputations derived from calendar information).

2.3.4. The monthly amount is missing (code 99999999), but the annual amount is given

The monthly amount is calculated by dividing the annual amount by the number of months (Remark: the numbers of months are imputed first and therefore do always exist).

2.3.5. The annual amount is missing, but the monthly amount is given

Nothing is done. The monthly amount is used. However, the annual amount can be calculated by multiplying monthly amount and number of months.

2.3.6. The net amount is missing, but the gross amount is given

The net/gross ratio is obtained (either copied from other variables or imputed using the Michigan software) and the net amount is calculated as 'gross amount times net/gross ratio.

2.3.7. The gross amount, but the net amount is given

The gross amount can be calculated as 'net amount divided by net/gross ratio'.

2.3.8. The amount is missing, but the approximate range is known

The amount is imputed within the interval defined by the approximate range.

2.3.9. The approximate range is missing (and – implicitly – the amount)

A. If for a unit (household or person) neither the amount nor the approximate range is known, the corresponding amount from the most recent previous wave – whether imputed or declared – is forwarded. (Remark 1: For the initial wave of a country, information from the following wave is copied – this is, however, never imputed but only declared. Remark 2: Even if a unit was interviewed before, it can happen that the specific income component was not obtained. Thus the amount is still missing after this operation.)

B. For those units (households or persons) for which the amount is known – after the operation described above -, it is classified in the corresponding range. Thus only for units with neither amount nor range information, the approximate range is missing. For these units, the approximate range is imputed using the IVE software. If the IVE imputation does not converge, an imputation procedure similar to that for numbers of months is applied.

2.3.10. The amount is missing

A. If a value is missing, then the corresponding value from the most recent wave is copied – whether imputed or declared. (Remark 1: For the initial wave of a country, information from the following wave is copied – this is, however, never imputed but

only declared. Remark 2: The procedure for the amount of wage and salary earnings is different and is described in detail in the algorithm.)

B. Some components are imputed as such (i.e. as detailed as collected), others are aggregated (i.e. some components are grouped together) and the aggregate is imputed. For missing components, lower and upper limits are specified and the imputed value will fall inside this predefined interval.

2.4. Imputation with the IVE software

For imputing amounts, ranges and net/gross ratios for wage and salary earnings, the impute module of the IVE software (Imputation and Variance Estimation Software, by the Survey Research Center, Institute for Social Research of the University of Michigan) is used. The software and documentation of this software is available under 'http://www.isr.umich.edu/src/smp/ive'.

3. THE ALGORITHM

3.1. Remove outliers

For each of the amount-variables to be imputed, the initial amounts - i.e. the amounts transmitted to Eurostat - are checked for outliers. A pragmatic approach was taken: the ten smallest and the ten largest amount within a country are printed. In order to remove extreme values the interval allowed for the corresponding variables (default interval: 1-99999990) is reduced. The values outside this reduced interval are set to missing (99999999).

It has to be noted, that setting these intervals is subjective and depends to a large extent on the input-data. And, subsequently, any imputation depends on the quality of the input-data.

3.2. Define the lower and upper limits for each detailed income component

When imputing with the IVE software, lower and upper limits have to be specified for each amount to be imputed.

For each wave and country, lower and upper limit for each income component are calculated as minimum and maximum value of the values declared during interviews. Note that outliers have been removed before calculating minima and maxima.

3.3. Assemble auxiliary information for imputing 'filters' and 'numbers of months'

During the interviews, a wide range of information concerning the households and individuals is collected. Some of this information is used for replacing missing answers concerning income, e.g. if a person declares having been in self-employment, but at the same time, the information on whether there has been any income from self-employment is missing, it is supposed that there has been some income from self-employment.

The conditions under which a 'missing filter' is set to 'yes' are given for each variable in Chapter 4. These conditions are expressed in terms of variables of the questionnaires (see 'ECHP variable list and codebook') and of the ECHP UDB (see 'ECHP UDB description of variables').

Some other variables (NB_xxxx) are derived from variables in the ECHP UDB. Their construction is as follows:

From the calendar of activities for the current wave (PC001 – PC012), derive

NB_EMPL Number of months in paid employment
NB_APPR Number of months in paid apprenticeship
NB_EMPR Number of months in paid employment or apprenticeship
NB_SELF Number of months in self-employment
NB_UNPA Number of months in unpaid work in family enterprise
NB_EDUC Number of months in education or training
NB_UNEM Number of months in unemployment
NB_RETI Number of months in retirement

From the calendar of activities for all previous waves x, derive the auxiliary variable NB_RETIx. Replace the value of NB_RETI by the maximum of NB_RETI and all NB_RETIx. This is done to make sure, that if a person has been in retirement in one wave of the ECHP, it will be retired in the following waves. (Remark: This information is only used to replace 'missing' by 'yes'. A 'no' will never be modified into 'yes'.)

3.4. Impute 'filters'

Based on other information collected during the interview, missing answers to filter questions are replaced by 'yes' or 'no'.

3.5. Impute 'numbers of months'

If the number of months for which a specific component has been obtained is missing, this number is either derived from other information declared during the interview or a random number is imputed. The approach is in line with that for imputing filters.

If the filter for a certain component is changed via calendar information, the corresponding number of months is imputed from the calendar as well.

For all other components and for countries, where no calendar information is given, or if calendar information is missing for a person, the number of months is imputed by a random procedure. For a given component the following is done:

Step 1: Calculate the distribution of number of months for those units (persons or households) with valid number of months and produce the following table

Number of months	Percentage distribution	Cumulative percentage
1	p_1 %	p_1 %
2	p_2 %	p_1 % + p_2 %
13	p_{13} %	p_1 % + p_2 % + … + p_{13} %
14	p_{14} %	100 %

Remark: $p_1 + \ldots + p_{14} = 100$

Step 2: For each unit with missing number of months, a random number RN (uniformly distributed, from 0 to 100) is created. If RN ≤ p1, the number of months is set to 1, if p1 < RN ≤ (p1+p2), the number of months is set to 2, and so on.

3.6. Impute ranges

For income from self-employment, capital income at the individual level, and total monthly income and rental income at the household level, the interviewee has the possibility to provide an approximate range if the exact amount is unknown.

Step 1: If the actual amount and the approximate range are missing, then the corresponding variables for actual amounts in the most recent wave (or the following wave in case of wave 1) are checked. If a value is available - even imputed, this amount is assigned to the current wave.

Step 2: All the amounts available after step 1 are assigned to the corresponding ranges. Then the missing ranges are imputed. A first imputation is made like that for the

number of months (see above). A second imputation is done with the IVE program. If this second imputation converges, it is retained. Otherwise, the first imputation is used.

3.7. Convert annual amounts into monthly amounts

Whenever a monthly amount is missing but the corresponding annual amount is known, the annual amount is divided by the corresponding number of months (which has been imputed beforehand).

3.8. Impute personal net/gross ratios

Net and gross amounts are collected for wage and salary earnings at the time of the interview and for the year prior to the survey. Thereof, personal net/gross ratios can be calculated. Whenever a net/gross ratio cannot be calculated, the following is done:

Step 1 : As far as possible , another net/gross ratio of he same person - either from the same wave or from a previous wave is copied.

Step 2: Personal net/gross ratios that are still missing after step 1 are imputed with the IVE software. (On how the imputation of net amounts interacts with gross amounts and net/gross ratios, see the detailed description for imputation of wage and salary earnings.)

3.9. Impute amounts

Step 1: Whenever an amount is missing, corresponding amounts from the previous wave are copied to the current wave. However, if net and gross values are asked for, or if it is possible to provide annual or monthly amounts, the forwarding from a previous wave is not straightforward (see the detailed description for imputation of wage and salary earnings).

Step 2: Amounts that are still missing after step 1 are actually imputed.

If the filter question indicates that this component has been received, but the amount is 'special value = 99999997' (meaning not applicable in this country), then the amount is set to 0.

If the filter question indicates that this component has not been received, then the amount is set to 0.

Define lower and upper limit for the interval in which the imputed amount has to be. Three different scenarios are possible:

For imputations referring to only one question in the questionnaire, this will be the interval [national minimum , national maximum].

For imputations referring to a component for which the range is given (i.e. for self-employment income, capital income, …) the lower and upper limits of the interval are the lower and upper limits of the range (note that the range is imputed first).

If an aggregate of several sub-components is imputed, only the missing components are used to define the length of the interval, while the known components are added to each limit of the interval with their known values.

The actual imputation is done for logarithmic amounts. Consequently, the interval limits have to be transformed with the log-function.

3.10. Income variables in the ECHP UDB

The ECHP UDB contains annual net income data. In order to obtain these data, most of the income components that are imputed are directly assigned to UDB variables (e.g. social transfers). Income components that are declared as gross are imputed as gross. They have to be converted into net values by applying the net/gross ratio specific for their household to the gross value (see the chapter on the 'Net/gross ratio' for more information). The imputation of salary earnings is carried out in several steps and for several sub-components. These values are aggregated into two variables in the ECHP UDB.

4. IMPUTATION OF THE INDIVIDUAL INCOME COMPONENTS

4.1. Imputation - Household questionnaire

4.1.1. Rental income (HI122G)

Edited amount : Replace missing amounts with values from previous waves; if an approximate range is provided copy amount only when it fits the range .If no rental income is received, set the amount to 0. H0i1240E

H0i1220 = 1	H0i1230 = 1	1 ≤ H0i1240 ≤ 99999990		H0i1240
		1 ≤ H0i1250 ≤ 5	H0i1250 = 1 and 1 ≤ H0(i-1)1240I < 1000	H0(i-1)1240I
			H0i1250 = 2 and 1000 ≤ H0(i-1)1240I < 3000	H0(i-1)1240I
			H0i1250 = 3 and 3000 ≤ H0(i-1)1240I < 5000	H0(i-1)1240I
			H0i1250 = 4 and 5000 ≤ H0(i-1)1240I < 10000	H0(i-1)1240I
			H0i1250 = 5 and 10000 ≤ H0(i-1)1240I	H0(i-1)1240I
			else	.
		1 ≤ H0(i-x)1240I ≤ 99999990		H0(i-x)1240I
		else		.
	H0i1230 = 2	1 ≤ H0i1250 ≤ 5	H0i1250 = 1 and 1 ≤ H0(i-1)1240I < 1000	H0(i-1)1240I
			H0i1250 = 2 and 1000 ≤ H0(i-1)1240I < 3000	H0(i-1)1240I
			H0i1250 = 3 and 3000 ≤ H0(i-1)1240I < 5000	H0(i-1)1240I
			H0i1250 = 4 and 5000 ≤ H0(i-1)1240I < 10000	H0(i-1)1240I
			H0i1250 = 5 and 10000 ≤ H0(i-1)1240I	H0(i-1)1240I
			else	.
		1 ≤ H0(i-x)1240I ≤ 99999990		H0(i-x)1240I
		else		.
	H0i1230 = 9	H0i0810 ≠ 1 and H0i0830 ≠ 6		0
		1 ≤ H0(i-x)1240I ≤ 99999990		H0(i-x)1240I
		else		.
H0i1220 = 2				0
H0i1220 = 9	H0i0810 ≠ 1 and H0i0830 ≠ 6			0
	else			.

Range (imputed)	RANGRENT
1 ≤ H0i1250 ≤ 5	H0i1250
1 ≤ H0i1240E < 1000	1
1000 ≤ H0i1240E < 3000	2
3000 ≤ H0i1240E < 5000	3
5000 ≤ H0i1240E < 10000	4
10000 ≤ H0i1240E	5
else	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.6.

Before imputing HI122G, set limits for imputation

Lower bound LOWRENT is defined by RANGRENT which is imputed first.
Upper bound HIGRENT is defined by RANGRENT which is imputed first.

and transform values in logarithms

LH0i1240 = log (H0i1240E + 1)
LLOWRENT = log (LOWRENT + 1)
LHIGRENT = log (HIGRENT + 1)

Logarithm of amount (imputed) LH0i1240I

H0i1240 ≠ .	LH0i1240
H0i1240 = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.7.

HI122G = exp (LH0i1240I) - 1

HI122 = HI122G * HI020

4.1.2. Social assistance (HI137)

Filter H0i0900I

H0i0900 = 1	1
else	2

Number of months (imputed) H0i0930I

H0i0900 ≠ 1		0
else	0 ≤ H0i0930 ≤ 14	H0i0930
	H0i0930 = 97	1
	H0i0935 = 1	12
	Count the number N of variables H0i0940 … H0i1050 which have value 1, if N > 0	N
	else	Random number

Edited amount H0i1060E

H0i0900I ≠ 1		0
H0i0900I = 1	1 ≤ H0i1060 ≤ 99999990	H0i1060
	1 ≤ H0(i-x)1060I ≤ 99999990	H0(i-x)1060
	else	.

Before imputing HI137, set limits for imputation

Lower bound LOWSOC = national minimum (H0i1060)
Upper bound HIGSOC = national maximum (H0i1060)

and transform values in logarithms

LH0i1060 = log (H0i1060E + 1)
LLOWSOC = log (LOWSOC + 1)
LHIGSOC = log (HIGSOC + 1)

Logarithm of amount (imputed) LH0i1060I

H0i1060 ≠ .	LH0i1060
H0i1060 = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.7.

HI137 = (exp (LH0i1060I) - 1) * H0i0930I

4.1.3. Housing allowance (HI138)

Edited amount : Replace missing amounts with values from previous waves. If no housing allowance is received, set the amount to 0 H0i0420E

H0i0290 ≠ 1 and H0i0410 ≠ 1			0
else	1 ≤ H0i0420 ≤ 99999990		H0i0420
	1 ≤ H0(i-x)0420I ≤ 99999990	(H0i0430 = 97 and H0(i-x)0430 = 97) or (H0i0430 ≠ 97 and H0(i-x)0430 ≠ 97)	H0(i-x)0420I
		H0i0430 = 97	H0(i-x)0420I * 12
		H0(i-x)0430 = 97	H0(i-x)0420I / 12

Number of months (imputed) H0i0430

H0i0290 ≠ 1 and H0i0410 ≠ 1		0
else	0 ≤ H0i0430 ≤ 14	H0i0430
	H0i0430 = 97	1
	H0i0430 = 99	Random number

Before imputing HI138, set limits for imputation

Lower bound LOWHOUS = national minimum (H0i0420)
Upper bound HIGHOUS = national maximum (H0i0420)

and transform values in logarithms

LH0i0420 = log (H0i0420E + 1)
LLOWHOUS = log (LOWHOUS + 1)
LHIGHOUS = log (HIGHOUS + 1)

Logarithm of amount (imputed) LH0i0420I

H0i0420 ≠ .	LH0i0420
H0i0420 = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.7.

HI138 = (exp (LH0i0420I) - 1) * H0i0430I

4.1.4. Household's total net income per month (HI200)

Edited amount : Replace missing amounts with values from previous waves; if an approximate range is provided copy amount only when it fits the range

		H0i0850E
1 ≤ H0i0850 ≤ 99999990		H0i0850
1 ≤ H0i0860 ≤ 8	H0i0860 = 1 and 1 ≤ H0(i-1)0850I < 500	H0(i-1)0850I
	H0i0860 = 2 and 500 ≤ H0(i-1)0850I < 1000	H0(i-1)0850I
	H0i0860 = 3 and 1000 ≤ H0(i-1)0850I < 1500	H0(i-1)0850I
	H0i0860 = 4 and 1500 ≤ H0(i-1)0850I < 2000	H0(i-1)0850I
	H0i0860 = 5 and 2000 ≤ H0(i-1)0850I < 2500	H0(i-1)0850I
	H0i0860 = 6 and 2500 ≤ H0(i-1)0850I < 3000	H0(i-1)0850I
	H0i0860 = 7 and 3000 ≤ H0(i-1)0850I < 5000	H0(i-1)0850I
	H0i0860 = 8 and 5000 ≤ H0(i-1)0850I	H0(i-1)0850I
	else	.
1 ≤ H0(i-x)0850I ≤ 99999990		H0(i-x)0850I
else		.

Range (imputed) RANGREV

1 ≤ H0i0860 ≤ 8	H0i0860
1 ≤ H0i0850E < 500	1
500 ≤ H0i0850E < 1000	2
1000 ≤ H0i0850E < 1500	3
1500 ≤ H0i0850E < 2000	4
2000 ≤ H0i0850E < 2500	5
2500 ≤ H0i0850E < 3000	6
3000 ≤ H0i0850E < 5000	7
5000 ≤ H0i0850E	8
else	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.6.

Before imputing HI200, set limits for imputation

Lower bound LOWHHD is defined by RANGREV which is imputed first.
Upper bound HIGHHD is defined by RANGREV which is imputed first.

and transform values in logarithms

LH0i0850 = log (H0i0850E + 1)
LLOWHHD = log (LOWHHD + 1)
LHIGHHD = log (HIGHHD + 1)

Logarithm of amount (imputed) LH0i0850I

H0i0850 ≠ .	LH0i0850
H0i0850 = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.7.

HI200 = exp (LH0i0850I) - 1

4.2. Imputation - personal questionnaire - earnings from employment

Earnings from employment are asked in different places in the ECHP questionnaire. Current monthly earnings at the time of the interview are asked in the employment part of the questionnaire while earnings as an employee in the year prior to the survey are asked for in the income part of the questionnaire. All these different items are dealt with at the same time in the imputation procedure.

4.2.1. Current net and gross earnings from work (PI211M and PI211MG)

Current earnings from work are collected in different questions for people working 15 hours or more per week and for those working less than 15 hours. Consequently, the imputation is done separately for these two cases. However, the results are given in common variables in the ECHP UDB, namely PI211M and PI211MG.

The imputation interacts with that for regular wage and salary earnings in the year prior to the survey (see PI1111).

4.2.1.1. Current net earnings from work for people working 15 hours or more per week

Net amount P0i0610

PE001 ≠ 1,2,3	0
P0i0610 ≠ .,99999999	P0i0610
else	.

Gross amount P0i0600

PE001 ≠ 1,2,3	0
P0i0600 ≠ .,99999999	P0i0600
else	.

Net / Gross ratio C_NG_Ai

P0i0610 = 0 and P0i0600 = 0	0
P0i0610 ≠ . and P0i0600 ≠ .	P0i0610 / P0i0600
else	.

Net / Gross ratio (copy from other ratios) C_NG_Ai

0.2 ≤ C_NG_Ai ≤ 1	C_NG_Ai
0.2 ≤ C_NG_AI(i-x) ≤ 1, if i not first wave	C_NG_AI(i-x)
0.2 ≤ P_NG(i+1) ≤ 1, if i first wave	P_NG(i+1)
0.2 ≤ P_NGi ≤ 1	P_NGi
else	.

Edited net amount (copy from other variables) P0i0610E

P0i0610 ≠ .		P0i0610
P0i0600 ≠ .	C_NG_Ai ≠ .	P0i0600*C_NG_Ai
	else	.
0.2 ≤ C_NG_AI(i-x) ≤ 1, if i not first wave		P0(i-1)0610I
0.2 ≤ P_NG(i+1) ≤ 1, if i not first wave		P0(i+1)1890
0.2 ≤ P_NGi ≤ 1		P0i1890
else		.

Net / Gross ratio (imputed) C_NG_AIi

C_NG_Ai ≠ .	C_NG_Ai
C_NG_Ai = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.8. With lower limit for imputation 0.4 and upper limit 1.

Before imputing P0i0610I, set limits for imputation

Lower bound LOW0610 = national minimum (P0i0610)
Upper bound HIG0610 = national maximum (P0i0610)

and transform values in logarithms

LP0i0610 = log (P0i0610E + 1)
LLOW0610 = log (LOW0610 + 1)
LHIG0610 = log (HIG0610 + 1)

Logarithm of net amount (imputed) LP0i0610I

P0i0610 ≠ .	LP0i0610
P0i0610 = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.8.

P0i0610I = exp (LP0i0610I) - 1

If the gross amount is provided in the questionnaire and the net amount is not stated, the imputed net amount is replaced by the product of gross amount and imputed ratio C_NG_AI.

Net amount (derived from gross amount and imputed ratio) **P0i0610I**

P0i0610E = .	P0i0600 ≠ .	**P0i0600 * C_NG_AIi**
else		**P0i0610I**

The gross amount can than be calculated from the net amount and the net/gross ratio.

Gross amount (derived from imputed net amount and imputed ratio) **P0i0600I**

	P0i0610I / C_NG_AIi

4.2.1.2. Current earnings from work for people working less than 15 hours per week

Filter P0i0950I

P0i0950 = 1		1
P0i0950 = 2		2
P0i0950 = 9	NB_EMPR > 0 or NB_SELF > 0 or NB_UNPA > 0	1
	else	2

Net amount P0i0970

P0i0950I ≠ 1	0
P0i0970 ≠ .,99999999	P0i0970
else	.

Gross amount P0i0960

P0i0950I ≠ 1	0
P0i0960 ≠ .,99999999	P0i0960
else	.

Net / Gross ratio C_NG_Bi

P0i0970 = 0 and P0i0960 = 0	0
P0i0970 ≠ . and P0i0960 ≠ .	P0i0970 / P0i0960
else	.

Net / Gross ratio (copy from other ratios) C_NG_Bi

0.2 ≤ C_NG_Bi ≤ 1	C_NG_Bi
0.2 ≤ C_NG_BI(i-x) ≤ 1, if i not first wave	C_NG_BI(i-x)
0.2 ≤ P_NG(i+1) ≤ 1, if i first wave	P_NG(i+1)
0.2 ≤ P_NGi ≤ 1	P_NGi
else	.

Edited net amount (copy from other variables) P0i0970E

P0i0970 ≠ .		P0i0970
P0i0960 ≠ .	C_NG_Bi ≠ .	P0i0960*C_NG_Bi
	else	.
0.2 ≤ C_NG_BI(i-x) ≤ 1, if i not first wave		P0(i-1)0970I
0.2 ≤ P_NG(i+1) ≤ 1, if i not first wave		P0(i+1)1890
0.2 ≤ P_NGi ≤ 1		P0i1890
else		.

Net / Gross ratio (imputed) C_NG_BIi

C_NG_Bi ≠ .	C_NG_Bi
C_NG_Bi = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.8. With lower limit for imputation 0.4 and upper limit 1.

Before imputing P0i0970I, set limits for imputation

Lower bound LOW0970 = national minimum (P0i0970)
Upper bound HIG0970 = national maximum (P0i0970)

and transform values in logarithms

LP0i0970 = log (P0i0970E + 1)
LLOW0970 = log (LOW0970 + 1)
LHIG0970 = log (HIG0970 + 1)

Logarithm of net amount (imputed) LP0i0970I

P0i0970 ≠ .	LP0i0970
P0i0970 = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.8.

P0i0970I = exp (LP0i0970I) - 1

If the gross amount is provided in the questionnaire and the net amount is not stated, the imputed net amount is replaced by the product of gross amount and imputed ratio C_NG_BI.

Net amount (derived from gross amount and imputed ratio) **P0i0970I**

P0i0970 = .	P0i0960 ≠ .	**P0i0960 * C_NG_BIi**
else		**P0i0970I**

The gross amount can than be calculated from the net amount and the net/gross ratio.

Gross amount (derived from imputed net amount and imputed ratio) **P0i0960I**

	P0i0970I / C_NG_BIi

PI211M = max (P0i0610I, P0i0970I)

PI211MG = max (P0i0600I, P0i0960I)

4.2.2. Regular wage and salary earnings (PI1111)

Regular wage and salary earnings are composed of monthly wage, 13th and 14th salary, extra payments for overtime, holiday pay, earnings from an additional job, and other earnings not specified separately. The components are imputed in several steps, some of them individually, others are grouped together before imputation.

This imputation interacts with that for current wage and salary earnings (see PI211M).

4.2.2.1. Component 1: Net **monthly** wage

Filter P0i1870I

P0i1870 = 1		1
P0i1870 = 2		2
P0i1870 = 9	NB_EMPR > 0	1
	else	2

Number of months (imputed) P0i1900I

P0i1870I ≠ 1			0
P0i1870I = 1	1 ≤ P0i1900 ≤ 14		P0i1900
	P0i1900 = 97, 99	NB_EMPR > 0	NB_EMPR
		else	random number

Number of months (imputed) - corrected for 13th and 14th salary P0i1900I

P0i1900I = 14	P0i1970I = 1 and P0i1990I = 1	12
	P0i1970I = 1 or P0i1990I = 1	13
	else	14
P0i1900I = 13	P0i1970I = 1 or P0i1990I = 1	12
	else	13
else		P0i1900I

Attention: Filters for 13th and 14th salary have to be imputed first.

Net monthly amount (convert annual amount into monthly) P0i1890

P0i1870I = 1	1≤P0i1890≤99999990	P0i1890
	1≤P0i1920≤99999990	P0i1920 / P0i1900I
	else	.
else		0

Gross monthly amount (convert annual amount into monthly) P0i1880

P0i1870I = 1	1≤P0i1880≤99999990	P0i1880
	1≤P0i1910≤99999990	P0i1910 / P0i1900I
	else	.
P0i1870I = 2		0

Net / Gross ratio P_NGi

P0i1890 = 0 and P0i1880 = 0	0
P0i1890 ≠ .,99999999 and P0i1880 ≠ .,99999999	P0i1890 / P0i1880
else	.

Net / Gross ratio (copy from other ratios) P_NGi

0.2 ≤ P_NGi ≤ 1	P_NGi
0.2 ≤ C_NG_AI(i-1) ≤ 1	C_NG_AI(i-1)
0.2 ≤ C_NG_BI(i-1) ≤ 1	C_NG_BI(i-1)
0.2 ≤ P_NGI(i-x) ≤ 1, if not initial wave	P_NGI(i-x)
0.2 ≤ P_NG(i+1) ≤ 1, if initial wave	P_NGI(i+1)
0.2 ≤ C_NG_Ai ≤ 1	C_NG_Ai
0.2 ≤ C_NG_Bi ≤ 1	C_NG_Bi
else	.

Edited net amount (copy from other variables) P0i1890E

P0i1890 ≠ .		P0i1890
P0i1880 ≠ .	P_NGi ≠ .	P0i1880*P_NGi
	else	.
0.2 ≤ C_NG_AI(i-1) ≤ 1		P0(i-1)0610I
0.2 ≤ C_NG_BI(i-1) ≤ 1		P0(i-1)0970I
0.2 ≤ P_NGI(i-x) ≤ 1, if not initial wave		P0(i-x)1890I
0.2 ≤ P_NG(i+1) ≤ 1, if initial wave		P0(i+1)1890I
0.2 ≤ C_NG_Ai ≤ 1		P0i0610
0.2 ≤ C_NG_Bi ≤ 1		P0i0970
else		.

Net / Gross ratio (imputed) P_NGIi

P_NGi ≠ .	P_NGi
P_NGi = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.8. With lower limit for imputation 0.4 and upper limit 1.

Before imputing P0i1890I, set limits for imputation

Lower bound LOW1890 = national minimum (P0i1890)
Upper bound HIG1890 = national maximum (P0i1890)

and transform values in logarithms

LP0i1890 = log (P0i1890E + 1)
LLOW1890 = log (LOW1890 + 1)
LHIG1890 = log (HIG1890 + 1)

Logarithm of net amount (imputed) LP0i1890I

P0i1890 ≠ .	LP0i1890
P0i1890 = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.8.

P0i1890I = exp (LP0i1890I) - 1

If the gross amount is provided in the questionnaire and the net amount is not stated, the imputed net amount is replaced by the product of gross amount and imputed ratio P_NGI.

Net amount (derived from gross amount and imputed ratio) **P0i1890I**

P0i1890 = .	P0i1880 ≠ .	**P0i1880 * P_NGIi**
else		**P0i1890I**

4.2.2.2. Components 2 and 3: Salary for 13th and 14th month

These two components are not imputed separately. After the net monthly salary has been imputed, missing salaries for 13th and 14th month are replaced by the monthly salary.

Component 2: 13th month

Filter P0i1970

P0i1970 = 1		1
P0i1970 = 2,7		2
P0i1970 = 9	NB_EMPR > 0	1
	else	2

Edited net amount P0i1980E

P0i1970I ≠ 1	0
P0i1980 ≠ .,99999999	P0i1980
else	.

Imputed net amount **P0i1980I**

P0i1980E ≠ .	**P0i1980E**
else	**P0i1890I**

Component 3: 14th month

Filter P0i1990

P0i1990 = 1		1
P0i1990 = 2,7		2
P0i1990 = 9	NB_EMPR > 0	1
	else	2

Edited net amount P0i2000E

P0i1990I ≠ 1	0
P0i2000 ≠ .,99999999	P0i2000
else	.

Imputed net amount **P0i2000I**

P0i2000 ≠ .	**P0i2000E**
else	**P0i1890I**

4.2.2.3. Components 4, 5 and 6: Other monthly extra payments

Component 4: Extra payments for overtime

Filter P0i1940I

P0i1940 = 1	1
P0i1940 = 2,7,9	2

Number of months P0i1960I

P0i1940I ≠ 1		.
P0i1940I = 1	1 ≤ P0i1960 ≤ 14	P0i1960
	P0i1960 = 97	1
	else	random number

Edited net amount P0i1950E

P0i1940I ≠ 1	0
P0i1950 = 99999997	0
P0i1950 ≠ .,99999999	P0i1950
else	.

Lower bound for imputation LOW1950

P0i1950E ≠ .	P0i1950E
P0i1950E = .	min [P0i1890I, national minimum (P0i1950)]

Upper bound for imputation HIG1950

P0i1950E ≠ .	P0i1950E
P0i1950E = .	min [P0i1890I, national maximum (P0i1950)]

Component 5: Holiday pay or allowance

Filter P0i2010I

P0i2010 = 1		1
P0i2010 = 2,7		2
P0i2010 = 9	NB_EMPR > 0	1
	else	2

Edited net amount P0i2020E

P0i2010I ≠ 1	0
P0i2020 = 99999997	0
P0i2020 ≠ .,99999999	P0i2020
else	.

Lower bound for imputation LOW2020

P0i2020E ≠ .	P0i2020E
P0i2020E = .	min [P0i1890I, national minimum (P0i2020)]

Upper bound for imputation HIG2020

P0i2020E ≠ .	P0i2020E
P0i2020E = .	min [P0i1890I, national maximum (P0i2020)]

Component 6: Other payments

Filter P0i2090I

P0i2090 = 1	1
P0i2090 = 2,7,9	2

Edited net amount P0i2110E

P0i2090I ≠ 1	0
P0i2110 = 99999997	0
P0i2110 ≠ .,99999999	P0i2110
else	.

Lower bound for imputation LOW2110

P0i2110E ≠ .	P0i2110E
P0i2110E = .	min [P0i1890I, national minimum (P0i2110)]

Upper bound for imputation HIG2110

P0i2110E ≠ .	P0i2110E
P0i2110E = .	min [P0i1890I, national maximum (P0i2110)]

Components 4,5 and 6 are imputed together (EAROTHI)

Before imputing EAROTHI, calculate the sum of the components that are given and set limits for imputation

EAROTHE = P0i1950E * P0i1960I + P0i2020E + P0i2110E

Lower bound for imputation:
LOWOTHE = LOW1950 * P0i1960I + LOW2020 + LOW2110
Upper bound for imputation
HIGOTHE = HIG1950 * P0i1960I + HIG2020 + HIG2110

If the variable EAROTHI is available from the most recent wave in which the person was interviewed, and if its value equals EAROTHE or is higher, then this amount is copied and no imputation is carried out.

Edited sum of components EAROTHE

EAROTHE ≤ EAROTHI(i-x) < HIGOTHE	EAROTHI(i-x)
else	EAROTHE

Adapt lower bound for imputation after the editing of sum of components LOWOTHE

EAROTHE ≤ EAROTHI(i-x) < HIGHOTHE	EAROTHI(i-x)
else	LOWOTHE

Adapt upper bound for imputation after the editing of sum of components HIGOTHE

EAROTHE ≤ EAROTHI(i-x) < HIGHOTHE	EAROTHI(i-x)
else	HIGOTHE

Transform values in logarithms

LEAROTH = log (EAROTH + 1)
LLOWOTHE log (LOWOTHE + 1)
LHIGOTHE = log (HIGOTHE + 1)

Logarithm of amount (imputed) LEAROTHI

LLOWOTHE = LHIGOTHE	LEAROTH
LLOWOTHE ≠ LHIGOTHE	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10.

EAROTHI = exp (LEAROTHI) - 1

4.2.2.4. Component 7: Additional income from work not covered elsewhere

Filter P0i2240I

P0i2240 = 1	1
P0i2240 = 2,7,9	2

Number of months P0i2280I

P0i2240I ≠ 1		.
P0i2240I = 1	1 ≤ P0i2280 ≤ 14	P0i2280
	P0i2280 = 97	1
	else	random number

Edited net monthly amount P0i2270E

P0i2240I ≠ 1	0
P0i2270 = 99999997 and P0i2290 = 99999997	0
P0i2270 ≠ .,99999999	P0i2270
P0i2290 ≠ .,99999999	P0i2290/P0i2280I
else	.

Before imputing P0i2270I, set limits for imputation

Lower bound LOW2270 = national minimum (P0i2270)
Upper bound HIG2270 = national maximum (P0i2270)

and transform values in logarithms

LP0i2270 = log (P0i2270E + 1)
LLOW2270 = log (LOW2270 + 1)
LHIG2270 = log (HIG2270 + 1)

Logarithm of net amount (imputed) LP0i2270I

P0i2270 ≠ .	LP0i2270
P0i2270 = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10

P0i2270I = exp (LP0i2270I) - 1

PI1111 =
P0i1890I * P0i1900I + P0i1980I + P0i2000I +EAROTHI + P0i2270I * P0i2280I

4.2.3. Lumpsum wage and salary earnings (PI1112)

Lumpsum wage and salary earnings are composed of profit sharing bonuses, company shares and other lumpsum payments.

Component 1: Profit sharing bonus

Filter P0i2030I

P0i2030 = 1		1
P0i2030 = 2,7		2
P0i2030 = 9	NB_EMPR > 0	1
	else	2

Edited net amount P0i2040E

P0i2030I ≠ 1	0
P0i2040 = 99999997	0
P0i2040 ≠ .,99999999	P0i2040
P0(i-x)2040 ≠ .,99999999	P0(i-x)2040
else	.

Lower bound for imputation LOW2040

P0i2040E ≠ .	P0i2040E
P0i2040E = .	national minimum (P0i2040)

Upper bound for imputation HIG2040

P0i2040E ≠ .	P0i2040E
P0i2040E = .	national maximum (P0i2040)

Component 2: Other lump-sum payment

Filter P0i2050I

P0i2050 = 1	1
P0i2050 = 2,7,9	2

Edited net amount P0i2060E

P0i2050I ≠ 1	0
P0i2060 = 99999997	0
P0i2060 ≠ .,99999999	P0i2060
P0(i-x)2060 ≠ .,99999999	P0(i-x)2060
else	.

Lower bound for imputation LOW2060

P0i2060E ≠ .	P0i2060E
P0i2060E = .	national minimum (P0i2060)

Upper bound for imputation HIG2060

P0i2060E ≠ .	P0i2060E
P0i2060E = .	national maximum (P0i2060)

Component 3: Company shares

Filter P0i2070I

P0i2070 = 1		1
P0i2070 = 2,7		2
P0i2070 = 9	NB_EMPR > 0	1
	else	2

Edited net amount P0i2080E

P0i2070I ≠ 1	0
P0i2080 = 99999997	0
P0i2080 ≠ .,99999999	P0i2080
P0(i-x)2080 ≠ .,99999999	P0(i-x)2080
else	.

Lower bound for imputation LOW2080

P0i2080E ≠ .	P0i2080E
P0i2080E = .	national minimum (P0i2080)

Upper bound for imputation HIG2080

P0i2080E ≠ .	P0i2080E
P0i2080E = .	national maximum (P0i2080)

Before imputing PI1112, calculate the sum of the components that are given and set limits for imputation

SHARE = P0i2040E + P0i2060E + P0i2080E

Lower bound for imputation:
LOWSHAR = LOW2040 + LOW2060 + LOW2080
Upper bound for imputation
HIGSHAR = HIG2040 + HIG2060 + HIG2080

If the variable SHARI is available from the most recent wave in which the person was interviewed, and if its value equals SHARE or is higher, then this amount is copied and no imputation is carried out.

Edited sum of components SHARE

SHARE ≤ SHARI(i-x) < SHARE	SHARI(i-x)
else	SHARE

Adapt lower bound for imputation after the editing of sum of components LOWSHAR

SHARE ≤ SHARI(i-x) < SHARE	SHARI(i-x)
else	LOWSHAR

Adapt upper bound for imputation after the editing of sum of components HIGSHAR

SHARE ≤ SHARI(i-x) < SHARE	SHARI(i-x)
else	HIGSHAR

Transform values in logarithms

LSHARE = log (SHARE + 1)
LLOWSHAR log (LOWSHAR + 1)
LHIGSHAR = log (HIGSHAR + 1)

Logarithm of amount (imputed) LSHAREI

LLOWSHAR = LHIGSHAR	LSHARE
LLOWSHAR ≠ LHIGSHAR	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10.

PI1112 = SHAREI = exp (LSHAREI) - 1

4.3. Imputation - personal questionnaire - income from self-employment

4.3.1. Income from self-employment (PI112)

Pre-filter (Did you receive any income from self-employment?) P0i2130I

P0i2130 = 1		1
P0i2130 = 2		2
P0i2130 = 9	NB_SELF > 0	1
	else	2

Filter (Was there any profit?) P0i2210I

P0i2130I = 1	P0i2210 = 1		1
	P0i2210 = 2		2
	P0i2210 = 3		3
	P0i2210 = .	NB_SELF > 0	2
		else	3
	P0i2210 = 9		2
else			.

Edited gross amount : Replace missing amounts with values from previous waves; if an approximate range is provided copy amount only when it fits the range. P0i2220E

P0i2210I ≠ 1,2			0
P0i2210I = 1,2	1 ≤ P0i2220 ≤ 99999990		P0i2220
	1 ≤ P0i2230 ≤ 9	1 ≤ P0(i-x)2220I < 5000	P0(i-x)2220I
		5000 ≤ P0(i-x)2220I < 10000	P0(i-x)2220I
		10000 ≤ P0(i-x)2220I < 15000	P0(i-x)2220I
		15000 ≤ P0(i-x)2220I < 20000	P0(i-x)2220I
		20000 ≤ P0(i-x)2220I < 30000	P0(i-x)2220I
		30000 ≤ P0(i-x)2220I < 50000	P0(i-x)2220I
		50000 ≤ P0(i-x)2220I < 75000	P0(i-x)2220I
		75000 ≤ P0(i-x)2220I < 100000	P0(i-x)2220I
		100000 ≤ P0(i-x)2220I	P0(i-x)2220I
		else	.
	1 ≤ P0(i-x)2220I ≤ 99999990		P0(i-x)2220I
	else		.

Range (imputed) RANGSELF

1 ≤ P0i2230 ≤ 9	P0i2230
1 ≤ P0i2220E < 5000	1
5000 ≤ P0i2220E < 10000	2
10000 ≤ P0i2220E < 15000	3
15000 ≤ P0i2220E < 20000	4
20000 ≤ P0i2220E < 30000	5
30000 ≤ P0i2220E < 50000	6
50000 ≤ P0i2220E < 75000	7
75000 ≤ P0i2220E < 100000	8
100000 ≤ P0i2220E	9
else	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.9.

Before imputing P0i2220I, set limits for imputation

Lower bound LOWSEL is defined by RANGSELF which is imputed first.
Upper bound HIGSEL is defined by RANGSELF which is imputed first.

and transform values in logarithms

LP0i2220 = log (P0i2220E + 1)
LLOWSEL = log (LOWSEL + 1)
LHIGSEL = log (HIGSEL + 1)

Logarithm of gross amount (imputed) LP0i2220I

P0i2220 ≠ .	LP0i2220
P0i2220 = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10

P0i2220I = exp (LP0i2220I) - 1

In order to obtain the net income from self employment, the gross amount is multiplied with the net/gross factor HI020 for its household (see definition of HI020).

PI112 = P0i2220I * HI020

4.4. Imputation - personal questionnaire - non-work private income

4.4.1. Income from capital or investment (PI121)

Pre-filter (Did you receive any income from capital or investment ?) P0i3320I

P0i3320 = 1		1
P0i3320 = 2		2
P0i3320 = 9	H0i0810 = 1 or H0i0830 = 6	1
	else	2

Filter (Do you know how much ?) P0i3330I

P0i3320 = 1	P0i3330 = 1		1
	P0i3330 = 2		2
	P0i3330 = .	H0i0810 = 1 or H0i0830 = 6	2
		else	.
	P0i3330 = 9	H0i0810 = 1 or H0i0830 = 6	2
		else	3
else			.

Edited amount : Replace missing amounts with values from previous waves; if an approximate range is provided copy amount only when it fits the range P0i3340E

P0i3330I ≠ 1,2			0
P0i3330I = 1,2	1 ≤ P0i3340 ≤ 99999990		P0i3340
	1 ≤ P0i3360 ≤ 5	1 ≤ P0(i-x)3340I < 1000	P0(i-x)3340I
		1000 ≤ P0(i-x)3340I < 3000	P0(i-x)3340I
		3000 ≤ P0(i-x)3340I < 5000	P0(i-x)3340I
		5000 ≤ P0(i-x)3340I < 10000	P0(i-x)3340I
		10000 ≤ P0(i-x)3340I	P0(i-x)3340I
		else	.
	1 ≤ P0(i-x)3340GI ≤ 99999990		P0(i-x)3340GI
	1 ≤ P0(i-x)3340NI ≤ 99999990		P0(i-x)3340NI
	else		.

Range (imputed) RANGCAP

1 ≤ P0i3360 ≤ 5	P0i3360
1 ≤ P0i3340E < 1000	1
1000 ≤ P0i3340E < 3000	2
3000 ≤ P0i3340E < 5000	3
5000 ≤ P0i3340E < 10000	4
10000 ≤ P0i3340E	5
else	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.9.

Before imputing P0i3340I, set limits for imputation

Lower bound LOWCAP is defined by RANGCAP which is imputed first.
Upper bound HIGCAP is defined by RANGCAP which is imputed first.

and transform values in logarithms

LP0i3340 = log (P0i3340E + 1)
LLOWCAP = log (LOWCAP + 1)
LHIGCAP = log (HIGCAP + 1)

Logarithm of gross amount (imputed) LP0i3340I

P0i3340 ≠ .	LP0i3340
P0i3340 = .	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10.

P0i3340I = exp (LP0i3340I) - 1

Capital income can be declared gross or net. Depending on variable P0i3350 (Question wording: Please indicate whether the amount is before or after tax.), gross amounts are multiplied with the net/gross factor HI020 for the household (see definition of HI020).

Was the amount net or gross? P0i3350I

P0i3350 = 1		1
P0i3350 = 2		2
P0i3350 = 9	country = 2 or 3 (Netherlands or Denmark)	1
	else	2

PI121 = P0i3340I * HI020, if P0i3350I = 1
PI121 = P0i3340I, if P0i3350I = 2

4.4.2. Private transfers, i.e. financial support or maintenance from relatives, friends or other persons outside the household (PI123)

This component corresponds to one item in the questionnaire and is imputed as such.

Filter P0i3290I

P0i3290 = 1	1
P0i3290 = 2,9	2

Edited amount P0i3300E

P0i3290I ≠ 1		0
P0i3290I = 1	1 ≤ P0i3300 ≤ 99999990	P0i3300
	1 ≤ P0(i-x)3300 ≤ 99999990	P0(i-x)3300
	else	.

Before imputing PI123, set limits for imputation

Lower bound LOW3300 = national minimum (P0i3300)
Upper bound HIG3300 = national maximum (P0i3300)

and transform values in logarithms

LP0i3300 = log (P0i3300E + 1)
LLOW3300 = log (LOW3300 + 1)
LHIG3300 = log (HIG3300 + 1)

Logarithm of amount (imputed) LP0i3300I

LLOW3300 = LHIG3300	LP0i3300
LLOW3300 ≠ LHIG3300	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10.

PI123 = exp (LP0i3300) - 1

4.5. Imputation - personal questionnaire - social transfers

4.5.1. Unemployment related benefits (PI131)

Unemployment related benefits are composed of five components. For each of these components, missing filters are adapted, missing numbers of months are inputed or randomly assigned, missing amounts are forwarded from previous waves. The lower and upper limits for imputation are defined by the lowest and highest value, respectively, in the edited data.

Then, the components are annualised and aggregated. The annual aggregate is imputed.

Component 1: Unemployment insurance benefit

Filter P0i2310I

P0i2310 = 1		1
P0i2310 = 2		2
P0i2310 = 9	NB_UNEM > 0	1
	else	2

Number of months P0i2330I

P0i2310I ≠ 1		.
P0i2310I = 1	1 ≤ P0i2330 ≤ 14	P0i2330
	P0i2330 = 97	1
	NB_UNEM ≠ .	NB_UNEM
	else	random number

Edited amount P0i2320E

P0i2310I ≠ 1		0
P0i2310I = 1	1 ≤ P0i2320 ≤ 99999990	P0i2320
	1 ≤ P0(i-x)2320 ≤ 99999990	P0(i-x)2320
	else	.

Lower bound for imputation LOW2320

P0i2320E ≠ .	P0i2320E
P0i2320E = .	national minimum (P0i2320)

Upper bound for imputation HIG2320

P0i2320E ≠ .	P0i2320E
P0i2320E = .	national maximum (P0i2320)

Component 2: Unemployment assistance

Filter P0i2340I

P0i2340 = 1		1
P0i2340 = 2		2
P0i2340 = 9	NB_UNEM > 0	1
	else	2

Number of months P0i2360I

P0i2340I ≠ 1		.
P0i2340I = 1	1 ≤ P0i2360 ≤ 14	P0i2360
	P0i2360 = 97	1
	NB_UNEM ≠ .	NB_UNEM
	else	random number

Amount P0i2350E

P0i2340I ≠ 1		0
P0i2340I = 1	1 ≤ P0i2350 ≤ 99999990	P0i2350
	1 ≤ P0(i-x)2350 ≤ 99999990	P0(i-x)2350
	else	.

Lower bound for imputation LOW2350

P0i2350E ≠ .	P0i2350E
P0i2350E = .	national minimum (P0i2350)

Upper bound for imputation HIG2350

P0i2350E ≠ .	P0i2350E
P0i2350E = .	national maximum (P0i2350)

Component 3: Training / retraining allowance

Filter P0i2370I

P0i2370 = 1		1
P0i2370 = 2		2
P0i2370 = 9	NB_UNEM > 0	1
	else	2

Number of months P0i2390I

P0i2370I ≠ 1		.
P0i2370I = 1	1 ≤ P0i2390 ≤ 14	P0i2390
	P0i2390 = 97	1
	NB_APPR ≠ .	NB_APPR
	else	random number

Edited amount P0i2380E

P0i2370I ≠ 1		0
P0i2370I = 1	1 ≤ P0i2380 ≤ 99999990	P0i2380
	1 ≤ P0(i-x)2380 ≤ 99999990	P0(i-x)2380
	else	.

Lower bound for imputation LOW2380

P0i2380E ≠ .	P0i2380E
P0i2380E = .	national minimum (P0i2380)

Upper bound for imputation HIG2380

P0i2380E ≠ .	P0i2380E
P0i2380E = .	national maximum (P0i2380)

Component 4: Placement, resettlement, and rehabilitation benefits

Filter P0i2400I

P0i2400 = 1		1
P0i2400 = 2		2
P0i2400 = 9	NB_UNEM > 0	1
	else	2

Number of months P0i2420I

P0i2400I ≠ 1		.
P0i2400I = 1	1 ≤ P0i2420 ≤ 14	P0i2420
	P0i2420 = 97	1
	NB_APPR ≠ .	NB_APPR
	else	random number

Edited amount P0i2410E

P0i2400I ≠ 1		0
P0i2400I = 1	1 ≤ P0i2410 ≤ 99999990	P0i2410
	1 ≤ P0(i-x)2410 ≤ 99999990	P0(i-x)2410
	else	.

Lower bound for imputation LOW2410

P0i2410E ≠ .	P0i2410E
P0i2410E = .	national minimum (P0i2410)

Upper bound for imputation HIG2410

P0i2410E ≠ .	P0i2410E
P0i2410E = .	national maximum (P0i2410)

Component 5: Other unemployment related benefits

Filter P0i2430I

P0i2430 = 1	1
P0i2430 = 2,9	2

Number of months P0i2450I

P0i2430I ≠ 1		.
P0i2430I = 1	1 ≤ P0i2450 ≤ 14	P0i2450
	P0i2450 = 97	1
	NB_APPR ≠ .	NB_UNEM
	else	random number

Edited amount P0i2440E

P0i2430I ≠ 1		0
P0i2430I = 1	1 ≤ P0i2440 ≤ 99999990	P0i2440
	1 ≤ P0(i-x)2440 ≤ 99999990	P0(i-x)2440
	else	.

Lower bound for imputation LOW2440

P0i2440E ≠ .	P0i2440E
P0i2440E = .	national minimum (P0i2440)

Upper bound for imputation HIG2440

P0i2440E ≠ .	P0i2440E
P0i2440E = .	national maximum (P0i2440)

Before imputing PI131, calculate the sum of the components that are given and set limits for imputation

UNEMP = P0i2320E * P0i2330I +
P0i2350E * P0i2360I +
P0i2380E * P0i2390I +
P0i2410E * P0i2420I +
P0i2440E * P0i2450I

Lower bound for imputation
LOWUNEMP = LOW2320 * P0i2330I +
LOW2350 * P0i2360I +
LOW2380 * P0i2390I +
LOW2410 * P0i2420I +
LOW2440 * P0i2450I

Upper bound for imputation
HIGUNEMP = HIG2320 * P0i2330I +
HIG2350 * P0i2360I +
HIG2380 * P0i2390I +
HIG2410 * P0i2420I +
HIG2440 * P0i2450I

If the variable UNEMPI is available from the most recent wave in which the person was interviewed, and if its value equals UNEMP or is higher, then this amount is copied and no imputation is carried out.

Edited sum of components UNEMP

UNEMP ≤ UNEMPI(i-x) < HIGUNEMP	UNEMPI(i-x)
else	UNEMP

Adapt lower bound for imputation after the editing of sum of components LOWUNEMP

UNEMP ≤ UNEMPI(i-x) < HIGUNEM	UNEMPI(i-x)
else	LOWUNEMP

Adapt upper bound for imputation after the editing of sum of components HIGUNEMP

UNEMP ≤ UNEMPI(i-x) < HIGUNEM	UNEMPI(i-x)
else	HIGUNEMP

Transform values in logarithms

LUNEMP = log (UNEMP + 1)
LLOWUNEM = log (LOWUNEMP + 1)
LHIGUNEM = log (HIGUNEMP + 1)

Logarithm of amount (imputed) LUNEMPI

LLOWUNEM = LHIGUNEM	LUNEMP
LLOWUNEM ≠ LHIGUNEM	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10.

PI131 = UNEMPI = exp (LUNEMPI) - 1

4.5.2. Pension or benefit relating to old-age or retirement (PI1321)

Pensions or benefits related to old-age or retirement are composed of six components. For each of these components, missing filters are adapted, missing numbers of months are inputed or randomly assigned, missing amounts are forwarded from previous waves. The lower and upper limits for imputation are defined by the lowest and highest value, respectively, in the edited data.

Then, the components are annualised and aggregated. The annual value is imputed.

Component 1: Old-age pension - Basic schemes (first pillar)

Filter P0i2470I

P0i2470 = 1		1
P0i2470 = 2		2
P0i2470 = 9	NB_RETI > 0	1
	else	2

Number of months P0i2490I

P0i2470I ≠ 1		.
P0i2470I = 1	1 ≤ P0i2490 ≤ 14	P0i2490
	P0i2490 = 97	1
	NB_RETI ≠ .	NB_RETI
	else	random number

Edited amount P0i2480E

P0i2470I ≠ 1		0
P0i2470I = 1	1 ≤ P0i2480 ≤ 99999990	P0i2480
	1 ≤ P0(i-x)2480 ≤ 99999990	P0(i-x)2480
	else	.

Lower bound for imputation LOW2480

P0i2480E ≠ .	P0i2480E
P0i2480E = .	national minimum (P0i2480)

Upper bound for imputation HIG2480

P0i2480E ≠ .	P0i2480E
P0i2480E = .	national maximum (P0i2480)

Component 2: Old-age pension - Supplementary schemes (second pillar)

Filter P0i2500I

P0i2500 = 1		1
P0i2500 = 2		2
P0i2500 = 9	NB_RETI > 0	1
	else	2

Number of months P0i2520I

P0i2500I ≠ 1		.
P0i2500I = 1	1 ≤ P0i2520 ≤ 14	P0i2520
	P0i2520 = 97	1
	NB_RETI ≠ .	NB_RETI
	else	random number

Edited amount P0i2510E

P0i2500I ≠ 1		0
P0i2500I = 1	1 ≤ P0i2510 ≤ 99999990	P0i2510
	1 ≤ P0(i-x)2510 ≤ 99999990	P0(i-x)2510
	else	.

Lower bound for imputation LOW2510

P0i2510E ≠ .	P0i2510E
P0i2510E = .	national minimum (P0i2510)

Upper bound for imputation HIG2510

P0i2510E ≠ .	P0i2510E
P0i2510E = .	national maximum (P0i2510)

Component 3: Old-age pension - Personal schemes (third pillar)

Filter P0i2530I

P0i2530 = 1		1
P0i2530 = 2		2
P0i2530 = 9	NB_RETI > 0	1
	else	2

Number of months P0i2550I

P0i2530I ≠ 1		.
P0i2530I = 1	1 ≤ P0i2550 ≤ 14	P0i2550
	P0i2550 = 97	1
	NB_RETI ≠ .	NB_RETI
	else	random number

Amount P0i2540E

P0i2530I ≠ 1		0
P0i2530I = 1	1 ≤ P0i2540 ≤ 99999990	P0i2540
	1 ≤ P0(i-x)2540 ≤ 99999990	P0(i-x)2540
	else	.

Lower bound for imputation LOW2540

P0i2540E ≠ .	P0i2540E
P0i2540E = .	national minimum (P0i2540)

Upper bound for imputation HIG2540

P0i2540E ≠ .	P0i2540E
P0i2540E = .	national maximum (P0i2540)

Component 4: Old-age pension - Means tested welfare schemes

Filter P0i2560I

P0i2560 = 1		1
P0i2560 = 2		2
P0i2560 = 9	NB_RETI > 0	1
	else	2

Number of months P0i2580I

P0i2560I ≠ 1		.
P0i2560I = 1	1 ≤ P0i2580 ≤ 14	P0i2580
	P0i2580 = 97	1
	NB_RETI ≠ .	NB_RETI
	else	random number

Edited amount P0i2570E

P0i2560I ≠ 1		0
P0i2560I = 1	1 ≤ P0i2570 ≤ 99999990	P0i2570
	1 ≤ P0(i-x)2570 ≤ 99999990	P0(i-x)2570
	else	.

Lower bound for imputation LOW2570

P0i2570E ≠ .	P0i2570E
P0i2570E = .	national minimum (P0i2570)

Upper bound for imputation HIG2570

P0i2570E ≠ .	P0i2570E
P0i2570E = .	national maximum (P0i2570)

Component 5: Early retirement schemes

Filter P0i2590I

P0i2590 = 1		1
P0i2590 = 2		2
P0i2590 = 9	NB_RETI > 0	1
	else	2

Number of months P0i2610I

P0i2590I ≠ 1		.
P0i2590I = 1	1 ≤ P0i2610 ≤ 14	P0i2610
	P0i2610 = 97	1
	NB_RETI ≠ .	NB_RETI
	else	random number

Edited amount P0i2600E

P0i2590I ≠ 1		0
P0i2590I = 1	1 ≤ P0i2600 ≤ 99999990	P0i2600
	1 ≤ P0(i-x)2600 ≤ 99999990	P0(i-x)2600
	else	.

Lower bound for imputation LOW2600

P0i2600E ≠ .	P0i2600E
P0i2600E = .	national minimum (P0i2600)

Upper bound for imputation HIG2600

P0i2600E ≠ .	P0i2600E
P0i2600E = .	national maximum (P0i2600)

Component 6: Other old-age related schemes or benefits

Filter P0i2620I

P0i2620 = 1	1
P0i2620 = 2,9	2

Number of months P0i2640I

P0i2620I ≠ 1		.
P0i2620I = 1	1 ≤ P0i2640 ≤ 14	P0i2640
	P0i2640 = 97	1
	NB_RETI ≠ .	NB_RETI
	else	random number

Edited amount P0i2630E

P0i2620I ≠ 1		0
P0i2620I = 1	1 ≤ P0i2630 ≤ 99999990	P0i2630
	1 ≤ P0(i-x)2630 ≤ 99999990	P0(i-x)2630
	else	.

Lower bound for imputation LOW2630

P0i2630E ≠ .	P0i2630E
P0i2630E = .	national minimum (P0i2630)

Upper bound for imputation HIG2630

P0i2630E ≠ .	P0i2630E
P0i2630E = .	national maximum (P0i2630)

Before imputing PI1321, calculate the sum of the components that are given and set limits for imputation

OLDAG = P0i2480E * P0i2490I +
P0i2510E * P0i2520I +
P0i2540E * P0i2550I +
P0i2570E * P0i2580I +
P0i2600E * P0i2610I +
P0i2630E * P0i2640I

Lower bound for imputation

LOWOLDAG = LOW2480 * P0i2490I +
LOW2510 * P0i2520I +
LOW2540 * P0i2550I +
LOW2570 * P0i2580I +
LOW2600 * P0i2610I +
LOW2630 * P0i2640I

Upper bound for imputation

HIGOLDAG = HIG2480 * P0i2490I +
HIG2510 * P0i2520I +
HIG2540 * P0i2550I +
HIG2570 * P0i2580I +
HIG2600 * P0i2610I +
HIG2630 * P0i2640I

If the variable OLDAGI is available from the most recent wave in which the person was interviewed, and if its value equals OLDAG or is higher, then this amount is copied and no imputation is carried out.

Edited sum of components OLDAG

OLDAG ≤ OLDAGI(i-x) < HIGOLDAG	OLDAGI(i-x)
else	OLDAG

Adapt lower bound for imputation after the editing of sum of components LOWOLDAG

OLDAG ≤ OLDAGI(i-x) < HIGOLDAG	OLDAGI(i-x)
else	LOWOLDAG

Adapt upper bound for imputation after the editing of sum of components HIGOLDAG

OLDAG ≤ OLDAGI(i-x) < HIGOLDAG	OLDAGI(i-x)
else	HIGOLDAG

Transform values in logarithms

LOLDAG = log (OLDAG + 1)
LLOWOLD = log (LOWOLDAG + 1)
LHIGOLD = log (HIGOLDAG + 1)

Logarithm of amount (imputed) LOLDAGI

LLOWOLD = LHIGOLD	LOLDAG
LLOWOLD ≠ LHIGOLD	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10.

PI1321 = OLDAGI = exp (LOLDAGI) - 1

4.5.3. Survivor's pension or benefits, that is, for widows or orphans (PI1322)

Survivor's pension or benefits are composed of six components. For each of these components, missing filters are adapted, missing numbers of months are inputed or randomly assigned, missing amounts are forwarded from previous waves. The lower and upper limits for imputation are defined by the lowest and highest value, respectively, in the edited data.

Then, the components are annualised and aggregated. The annual value is imputed.

Component 1: Widows pension - Basic schemes (first pillar)

Filter P0i2660I

P0i2660 = 1		1
P0i2660 = 2		2
P0i2660 = 9	PD005 = 4	1
	else	2

Number of months P0i2680I

P0i2660I ≠ 1		.
P0i2660I = 1	1 ≤ P0i2680 ≤ 14	P0i2680
	P0i2680 = 97	1
	else	random number

Edited amount P0i2670E

P0i2660I ≠ 1		0
P0i2660I = 1	1 ≤ P0i2670 ≤ 99999990	P0i2670
	1 ≤ P0(i-x)2670 ≤ 99999990	P0(i-x)2670
	else	.

Lower bound for imputation LOW2670

P0i2670E ≠ .	P0i2670E
P0i2670E = .	national minimum (P0i2670)

Upper bound for imputation HIG2670

P0i2670E ≠ .	P0i2670E
P0i2670E = .	national maximum (P0i2670)

Component 2 : Widows pension - Supplementary schemes (second pillar)

Filter P0i2690I

P0i2690 = 1		1
P0i2690 = 2		2
P0i2690 = 9	PD005 = 4	1
	else	2

Number of months P0i2710I

P0i2690I ≠ 1		.
P0i2690I = 1	1 ≤ P0i2710 ≤ 14	P0i2710
	P0i2710 = 97	1
	else	random number

Edited amount P0i2700E

P0i2690I ≠ 1		0
P0i2690I = 1	1 ≤ P0i2700 ≤ 99999990	P0i2700
	1 ≤ P0(i-x)2700 ≤ 99999990	P0(i-x)2700
	else	.

Lower bound for imputation LOW2700

P0i2700E ≠ .	P0i2700E
P0i2700E = .	national minimum (P0i2700)

Upper bound for imputation HIG2700

P0i2700E ≠ .	P0i2700E
P0i2700E = .	national maximum (P0i2700)

Component 3: Widows pension - Personal schemes (third pillar)

Filter P0i2720I

P0i2720 = 1		1
P0i2720 = 2		2
P0i2720 = 9	PD005 = 4	1
	else	2

Number of months P0i2740I

P0i2720I ≠ 1		.
P0i2720I = 1	1 ≤ P0i2740 ≤ 14	P0i2740
	P0i2740 = 97	1
	else	random number

Edited amount P0i2730E

P0i2720I ≠ 1		0
P0i2720I = 1	1 ≤ P0i2730 ≤ 99999990	P0i2730
	1 ≤ P0(i-x)2730 ≤ 99999990	P0(i-x)2730
	else	.

Lower bound for imputation LOW2730

P0i2730E ≠ .	P0i2730E
P0i2730E = .	national minimum (P0i2730)

Upper bound for imputation HIG2730

P0i2730E ≠ .	P0i2730E
P0i2730E = .	national maximum (P0i2730)

Component 4: Widows pension - Means-tested welfare schemes

Filter P0i2750I

P0i2750 = 1		1
P0i2750 = 2		2
P0i2750 = 9	PD005 = 4	1
	else	2

Number of months P0i2770I

P0i2750I ≠ 1		.
P0i2750I = 1	1 ≤ P0i2770 ≤ 14	P0i2770
	P0i2770 = 97	1
	else	random number

Edited amount P0i2760E

P0i2750I ≠ 1		0
P0i2750I = 1	1 ≤ P0i2760 ≤ 99999990	P0i2760
	1 ≤ P0(i-x)2760 ≤ 99999990	P0(i-x)2760
	else	.

Lower bound for imputation LOW2760

P0i2760E ≠ .	P0i2760E
P0i2760E = .	national minimum (P0i2760)

Upper bound for imputation HIG2760

P0i2760E ≠ .	P0i2760E
P0i2760E = .	national maximum (P0i2760)

Component 5: Other widow's benefits

Filter P0i2780I

P0i2780 = 1	1
P0i2780 = 2,9	2

Number of months P0i2770I

P0i2780I ≠ 1		.
P0i2780I = 1	1 ≤ P0i2770 ≤ 14	P0i2770
	P0i2770 = 97	1
	else	random number

Edited amount P0i2790E

P0i2780I ≠ 1		0
P0i2780I = 1	1 ≤ P0i2790 ≤ 99999990	P0i2790
	1 ≤ P0(i-x)2790 ≤ 99999990	P0(i-x)2790
	else	.

Lower bound for imputation LOW2790

P0i2790E ≠ .	P0i2790E
P0i2790E = .	national minimum (P0i2790)

Upper bound for imputation HIG2790

P0i2790E ≠ .	P0i2790E
P0i2790E = .	national maximum (P0i2790)

Component 6: Orphan's pension / allowance

Filter P0i2810I

P0i2810 = 1	1
P0i2810 = 2,9	2

Number of months P0i2800I

P0i2810I ≠ 1		.
P0i2810I = 1	1 ≤ P0i2800 ≤ 14	P0i2800
	P0i2800 = 97	1
	else	random number

Edited amount P0i2820E

P0i2810I ≠ 1		0
P0i2810I = 1	1 ≤ P0i2820 ≤ 99999990	P0i2820
	1 ≤ P0(i-x)2820 ≤ 99999990	P0(i-x)2820
	else	.

Lower bound for imputation LOW2820

P0i2820E ≠ .	P0i2820E
P0i2820E = .	national minimum (P0i2820)

Upper bound for imputation HIG2820

P0i2820 ≠ .	P0i2820
P0i2820 = .	national maximum (P0i2820)

Before imputing PI1322, calculate the sum of the components that are given and set limits for imputation

SURVIV = P0i2670E * P0i2680I +
P0i2700E * P0i2710I +
P0i2730E * P0i2740I +
P0i2760E * P0i2770I +
P0i2790E * P0i2800I +
P0i2820E * P0i2830I

Lower bound for imputation

LOWSURV = LOW2670 * P0i2680I +
LOW2700 * P0i2710I +
LOW2730 * P0i2740I +
LOW2760 * P0i2770I +
LOW2790 * P0i2800I +
LOW2820 * P0i2830I

Upper bound for imputation

HIGSURV = HIG2670 * P0i2680I +
HIG2700 * P0i2710I +
HIG2730 * P0i2740I +
HIG2760 * P0i2770I +
HIG2790 * P0i2800I +
HIG2820 * P0i2830I

If the variable SURVIVI is available from the most recent wave in which the person was interviewed, and if its value equals SURVIV or is higher, then this amount is copied and no imputation is carried out.

Edited sum of components SURVIV

SURVIV ≤ SURVIVI(i-x) < HIGSURVIV	SURVIVI(i-x)
else	SURVIV

Adapt lower bound for imputation after the editing of sum of components LOWSURVIV

SURVIV ≤ SURVIVI(i-x) < HIGSURVIV	SURVIVI(i-x)
else	LOWSURVIV

Adapt upper bound for imputation after the editing of sum of components HIGSURVIV

SURVIV ≤ SURVIVI(i-x) < HIGSURVIV	SURVIVI(i-x)
else	HIGSURVIV

Transform values in logarithms

LSURVIV = log (SURVIV + 1)
LLOWSURV = log (LOWSURV + 1)
LHIGSURV = log (HIGSURV + 1)

Logarithm of amount (imputed) LSURVIVI

LLOWSURV = LHIGSURV	LSURVIV
LLOWSURV ≠ LHIGSURV	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10.

PI1322 = SURVIVI = exp (LSURVIVI) - 1

4.5.4. Family related benefits, including maternity and single-parent benefits (PI133)

Family related benefits are composed of seven components. For each of these components, missing filters are adapted, missing numbers of months are inputed or randomly assigned, missing amounts are forwarded from previous waves. The lower and upper limits for imputation are defined by the lowest and highest value, respectively, in the edited data.

Then, the components are annualised and aggregated. The annual value is imputed.

Component 1: Child allowance

Filter P0i2850I

P0i2850 = 1		1
P0i2850 = 2		2
P0i2850 = 9	HD001 > HD002	1
	else	2

Number of months P0i2870I

P0i2850I ≠ 1		.
P0i2850I = 1	1 ≤ P0i2870 ≤ 14	P0i2870
	P0i2870 = 97	1
	else	random number

Edited amount P0i2860E

P0i2850I ≠ 1		0
P0i2850I = 1	1 ≤ P0i2860 ≤ 99999990	P0i2860
	1 ≤ P0(i-x)2860 ≤ 99999990	P0(i-x)2860
	else	.

Lower bound for imputation LOW2860

P0i2860E ≠ .	P0i2860E
P0i2860E = .	national minimum (P0i2860)

Upper bound for imputation HIG2860

P0i2860E ≠ .	P0i2860E
P0i2860E = .	national maximum (P0i2860)

Component 2: Allowance for care of invalid dependants

Filter P0i2880I

P0i2880 = 1	1
P0i2880 = 2,9	2

Number of months P0i2900I

P0i2880I ≠ 1		.
P0i2880I = 1	1 ≤ P0i2900 ≤ 14	P0i2900
	P0i2900 = 97	1
	else	random number

Edited amount P0i2890E

P0i2880I ≠ 1		0
P0i2880I = 1	1 ≤ P0i2890 ≤ 99999990	P0i2890
	1 ≤ P0(i-x)2890 ≤ 99999990	P0(i-x)2890
	else	.

Lower bound for imputation LOW2890

P0i2890E ≠ .	P0i2890E
P0i2890E = .	national minimum (P0i2890)

Upper bound for imputation HIG2890

P0i2890E ≠ .	P0i2890E
P0i2890E = .	national maximum (P0i2890)

Component 3: Maternity allowance

Filter P0i2910I

P0i2910 = 1		1
P0i2910 = 2		2
P0i2910 = 9	PD004 = 2 and PD003 ≤ 45	1
	else	2

Number of months P0i2930I

P0i2910I ≠ 1		.
P0i2910I = 1	1 ≤ P0i2930 ≤ 14	P0i2930
	P0i2930 = 97	1
	else	random number

Edited amount P0i2920E

P0i2910I ≠ 1		0
P0i2910I = 1	1 ≤ P0i2920 ≤ 99999990	P0i2920
	1 ≤ P0(i-x)2920 ≤ 99999990	P0(i-x)2920
	else	.

Lower bound for imputation LOW2920

P0i2920E ≠ .	P0i2920E
P0i2920E = .	national minimum (P0i2920)

Upper bound for imputation HIG2920

P0i2920E ≠ .	P0i2920E
P0i2920E = .	national maximum (P0i2920)

Component 4: Birth allowance

Filter P0i2940I

P0i2940 = 1	1
P0i2940 = 2,9	2

Number of months P0i2960I

P0i2940I ≠ 1		.
P0i2940I = 1	1 ≤ P0i2960 ≤ 14	P0i2960
	P0i2960 = 97	1
	else	random number

Edited amount P0i2950E

P0i2940I ≠ 1		0
P0i2940I = 1	1 ≤ P0i2950 ≤ 99999990	P0i2950
	1 ≤ P0(i-x)2950 ≤ 99999990	P0(i-x)2950
	else	.

Lower bound for imputation LOW2950

P0i2950E ≠ .	P0i2950E
P0i2950E = .	national minimum (P0i2950)

Upper bound for imputation HIG2950

P0i2950E ≠ .	P0i2950E
P0i2950E = .	national maximum (P0i2950)

Component 5: Unmarried mother's allowance

Filter P0i2970I

P0i2970 = 1	1
P0i2970 = 2,9	2

Number of months P0i2990I

P0i2970I ≠ 1		.
P0i2970I = 1	1 ≤ P0i2990 ≤ 14	P0i2990
	P0i2990 = 97	1
	else	random number

Edited amount P0i2980E

P0i2970I ≠ 1		0
P0i2970I = 1	1 ≤ P0i2980 ≤ 99999990	P0i2980
	1 ≤ P0(i-x)2980 ≤ 99999990	P0(i-x)2980
	else	.

Lower bound for imputation LOW2980

P0i2980E ≠ .	P0i2980E
P0i2980E = .	national minimum (P0i2980)

Upper bound for imputation HIG2980

P0i2980E ≠ .	P0i2980E
P0i2980E = .	national maximum (P0i2980)

Component 6: Deserted wife's allowance

Filter P0i3000I

P0i3000 = 1	1
P0i3000 = 2,9	2

Number of months P0i3020I

P0i3000I ≠ 1		.
P0i3000I = 1	1 ≤ P0i3020 ≤ 14	P0i3020
	P0i3020 = 97	1
	else	random number

Edited amount P0i3010

P0i3000I ≠ 1		0
P0i3000I = 1	1 ≤ P0i3010 ≤ 99999990	P0i3010
	1 ≤ P0(i-x)3010 ≤ 99999990	P0(i-x)3010
	else	.

Lower bound for imputation LOW3010

P0i3010E ≠ .	P0i3010E
P0i3010E = .	national minimum (P0i3010)

Upper bound for imputation HIG3010

P0i3010E ≠ .	P0i3010E
P0i3010E = .	national maximum (P0i3010)

Component 7: Other family-related benefits

Filter P0i3030I

P0i3030 = 1	1
P0i3030 = 2,9	2

Number of months P0i3050I

P0i3030I ≠ 1		.
P0i3030I = 1	1 ≤ P0i3050 ≤ 14	P0i3050
	P0i3050 = 97	1
	else	random number

Edited amount P0i3040E

P0i3030I ≠ 1		0
P0i3030I = 1	1 ≤ P0i3040 ≤ 99999990	P0i3040
	1 ≤ P0(i-x)3040 ≤ 99999990	P0(i-x)3040
	else	.

Lower bound for imputation LOW3040

P0i3040E ≠ .	P0i3040E
P0i3040E = .	national minimum (P0i3040)

Upper bound for imputation HIG3040

P0i3040E ≠ .	P0i3040E
P0i3040E = .	national maximum (P0i3040)

Before imputing PI133 calculate the sum of the components that are given and set limits for imputation

FAM = P0i2860E * P0i2870I +
P0i2890E * P0i2900I +
P0i2920E * P0i2930I +
P0i2950E * P0i2960I +
P0i2970E * P0i2980I +
P0i3010E * P0i3020I +
P0i3040E * P0i3050I

Lower bound for imputation

LOWFAM = LOW2860 * P0i2870I +
LOW2890 * P0i2900I +
LOW2920 * P0i2930I +
LOW2950 * P0i2960I +
LOW2970 * P0i2980I +
LOW3010 * P0i3020I +
LOW3040 * P0i3050I

Upper bound for imputation

HIGFAM = H0i2860 * P0i2870I +
HIG2890 * P0i2900I +
HIG2920 * P0i2930I +
HIG2950 * P0i2960I +
HIG2970 * P0i2980I +
HIG3010 * P0i3020I +
HIG3040 * P0i3050I

If the variable FAMI is available from the most recent wave in which the person was interviewed, and if its value equals FAM or is higher, then this amount is copied and no imputation is carried out.

Edited sum of components — FAM

FAM ≤ FAMI(i-x) < HIGFAM	FAMI(i-x)
else	FAM

Adapt lower bound for imputation after the editing of sum of components — LOWFAM

FAM ≤ FAMI(i-x) < HIGFAM	FAMI(i-x)
else	LOWFAM

Adapt upper bound for imputation after the editing of sum of components — HIGFAM

FAM ≤ FAMI(i-x) < HIGFAM	FAMI(i-x)
else	HIGFAM

Transform values in logarithms

LFAM = log (FAM + 1)
LLOWFAM = log (LOWFAM + 1)
LHIGFAM = log (HIGFAM + 1)

Logarithm of amount (imputed) — LFAMI

LLOWFAM = LHIGFAM	LFAM
LLOWFAM ≠ LHIGFAM	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10.

PI133 = exp (LFAMI) - 1

4.5.5. Benefits relating to sickness or invalidity (PI134)

Benefits relating to sickness or invalidity are composed of five components. For each of these components, missing filters are adapted, missing numbers of months are inputed or randomly assigned, missing amounts are forwarded from previous waves. The lower and upper limits for imputation are defined by the lowest and highest value, respectively, in the edited data.

Then, the components are annualised and aggregated. The annual value is imputed.

Component 1: Income maintenance benefits in case of sickness or injury

Filter P0i3070I

P0i3070 = 1		1
P0i3070 = 2		2
P0i3070 = 9	PH001 = 4,5	1
	else	2

Number of months P0i3090I

P0i3070I ≠ 1		.
P0i3070I = 1	1 ≤ P0i3090 ≤ 14	P0i3090
	P0i3090 = 97	1
	else	random number

Edited amount P0i3080E

P0i3070I ≠ 1		0
P0i3070I = 1	1 ≤ P0i3080 ≤ 99999990	P0i3080
	1 ≤ P0(i-x)3080 ≤ 99999990	P0(i-x)3080
	else	.

Lower bound for imputation LOW3080

P0i3080E ≠ .	P0i3080E
P0i3080E = .	national minimum (P0i3080)

Upper bound for imputation HIG3080

P0i3080E ≠ .	P0i3080E
P0i3080E = .	national maximum (P0i3080)

Component 2: Other sickness benefits

Filter P0i3100I

P0i3100 = 1	1
P0i3100 = 2,9	2

Number of months P0i3120I

P0i3100I ≠ 1		.
P0i3100I = 1	1 ≤ P0i3120 ≤ 14	P0i3120
	P0i3120 = 97	1
	else	random number

Edited amount P0i3110E

P0i3100I ≠ 1		0
P0i3100I = 1	1 ≤ P0i3110 ≤ 99999990	P0i3110
	1 ≤ P0(i-x)3110 ≤ 99999990	P0(i-x)3110
	else	.

Lower bound for imputation LOW3110

P0i3110E ≠ .	P0i3110E
P0i3110E = .	national minimum (P0i3110)

Upper bound for imputation HIG3110

P0i3110E ≠ .	P0i3110E
P0i3110E = .	national maximum (P0i3110)

Component 3: Compensation for occupational accidents and diseases

Filter P0i3130I

P0i3130 = 1		1
P0i3130 = 2		2
P0i3130 = 9	PH001 = 4,5	1
	else	2

Number of months P0i3150I

P0i3130I ≠ 1		.
P0i3130I = 1	1 ≤ P0i3150 ≤ 14	P0i3150
	P0i3150 = 97	1
	else	random number

Edited amount P0i3140E

P0i3130I ≠ 1		0
P0i3130I = 1	1 ≤ P0i3140 ≤ 99999990	P0i3140
	1 ≤ P0(i-x)3140 ≤ 99999990	P0(i-x)3140
	else	.

Lower bound for imputation LOW3140

P0i3140E ≠ .	P0i3140E
P0i3140E = .	national minimum (P0i3140)

Upper bound for imputation HIG3140

P0i3140E ≠ .	P0i3140E
P0i3140E = .	national maximum (P0i3140)

Component 4: Invalidity pension

Filter P0i3160I

P0i3160 = 1		1
P0i3160 = 2		2
P0i3160 = 9	PH001 = 4,5	1
	else	2

Number of months P0i3180I

P0i3160I ≠ 1		.
P0i3160I = 1	1 ≤ P0i3180 ≤ 14	P0i3180
	P0i3180 = 97	1
	else	random number

Edited amount P0i3170E

P0i3160I ≠ 1		0
P0i3160I = 1	1 ≤ P0i3170 ≤ 99999990	P0i3170
	1 ≤ P0(i-x)3170 ≤ 99999990	P0(i-x)3170
	else	.

Lower bound for imputation LOW3170

P0i3170E ≠ .	P0i3170E
P0i3170E = .	national minimum (P0i3170)

Upper bound for imputation HIG3170

P0i3170E ≠ .	P0i3170E
P0i3170E = .	national maximum (P0i3170)

Component 5: Other invalidity benefits

Filter P0i3190I

P0i3190 = 1	1
P0i3190 = 2,9	2

Number of months P0i3210I

P0i3190I ≠ 1		.
P0i3190I = 1	1 ≤ P0i3210 ≤ 14	P0i3210
	P0i3210 = 97	1
	else	random number

Edited amount P0i3200E

P0i3190I ≠ 1		0
P0i3190I = 1	1 ≤ P0i3200 ≤ 99999990	P0i3200
	1 ≤ P0(i-x)3200 ≤ 99999990	P0(i-x)3200
	else	.

Lower bound for imputation LOW3200

P0i3200E ≠ .	P0i3200E
P0i3200E = .	national minimum (P0i3200)

Upper bound for imputation HIG3200

P0i3200E ≠ .	P0i3200E
P0i3200E = .	national maximum (P0i3200)

Before imputing PI134 calculate the sum of the components that are given and set limits for imputation

SICK = P0i3080E * P0i3090I +
P0i3110E * P0i3120I +
P0i3140E * P0i3150I +
P0i3170E * P0i3180I +
P0i3200E * P0i3210I

Lower bound for imputation

LOWSICK = LOW3080 * P0i3090I +
LOW3110 * P0i3120I +
LOW3140 * P0i3150I +
LOW3170 * P0i3180I +
LOW3200 * P0i3210I

Upper bound for imputation

HIGSICK = HIG3080 * P0i3090I +
HIG3110 * P0i3120I +
HIG3140 * P0i3150I +
HIG3170 * P0i3180I +
HIG3200 * P0i3210I

If the variable SICKI is available from the most recent wave in which the person was interviewed, and if its value equals SICK or is higher, then this amount is copied and no imputation is carried out.

Edited sum of components SICK

SICK ≤ SICKI(i-x) < HIGSICK	SICKI(i-x)
else	SICK

Adapt lower bound for imputation after the editing of sum of components LOWSICK

SICK ≤ SICKI(i-x) < HIGSICK	SICKI(i-x)
else	LOWSICK

Adapt upper bound for imputation after the editing of sum of components HIGSICK

SICK ≤ SICKI(i-x) < HIGSICK	SICKI(i-x)
else	HIGSICK

Transform values in logarithms

LSICK = log (SICK + 1)
LLOWSICK = log (LOWSICK + 1)
LHIGSICK = log (HIGSICK + 1)

Logarithm of amount (imputed) LSICKI

LLOWSICK = LHIGSICK	LSICK
LLOWSICK ≠ LHIGSICK	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10.

PI134 = SICKI = exp (LSICKI) - 1

4.5.6. Education related allowances (PI135)

This component corresponds to one item in the questionnaire and is imputed as such.

Filter P0i3230I

P0i3230 = 1		1
P0i3230 = 2		2
P0i3230 = 9	NB_EDUC > 0	1
	else	2

Number of months P0i3250I

P0i3230I ≠ 1		.
P0i3230I = 1	1 ≤ P0i3250 ≤ 14	P0i3250
	P0i3250 = 97	1
	NB_EDUC ≠ .	NB_EDUC
	else	random number

Edited amount P0i3240E

P0i3230I ≠ 1		0
P0i3230I = 1	1 ≤ P0i3240 ≤ 99999990	P0i3240
	1 ≤ P0(i-x)3240 ≤ 99999990	P0(i-x)3240
	else	.

Before imputing PI135, set limits for imputation

Lower bound LOW3240 = national minimum (P0i3240)
Upper bound HIG3240 = national maximum (P0i3240)

and transform values in logarithms

LP0i3240 = log (P0i3240E + 1)
LLOW3240 = log (LOW3240 + 1)
LHIG3240 = log (HIG3240 + 1)

Logarithm of amount (imputed) LP0i3240I

LLOW3240 = LHIG3240	LP0i3240
LLOW3240 ≠ LHIG3240	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10.

PI135 = exp (LP0i3240) - 1

4.5.7. Any other personal social benefits (PI136)

This component corresponds to one item in the questionnaire and is imputed as such.

Filter P0i3260I

P0i3260 = 1	1
P0i3260 = 2,9	2

Number of months P0i3280I

P0i3260I ≠ 1		.
P0i3260I = 1	1 ≤ P0i3280 ≤ 14	P0i3280
	P0i3280 = 97	1
	else	random number

Edited amount P0i3270E

P0i3260I ≠ 1		0
P0i3260I = 1	1 ≤ P0i3270 ≤ 99999990	P0i3270
	1 ≤ P0(i-x)3270 ≤ 99999990	P0(i-x)3270
	else	.

Before imputing PI136, set limits for imputation

Lower bound LOW3270 = national minimum (P0i3270)
Upper bound HIG3270 = national maximum (P0i3270)

and transform values in logarithms

LP0i3270 = log (P0i3270E + 1)
LLOW3270 = log (LOW3270 + 1)
LHIG3270 = log (HIG3270 + 1)

Logarithm of amount (imputed) LP0i3270I

LLOW3270 = LHIG3270	LP0i3270
LLOW3270 ≠ LHIG3270	Imputation

The imputation is done via the IVE software using the auxiliary variables listed in 4.10.

PI136 = exp (LP0i3270) - 1

4.6. IVE imputation of household range-variables

Two separate regressions are carried out to impute the following variables:

RANGREV and RANGRENT

with the covariates including the auxiliary variables listed below.

Auxiliary variables:

HHTYP = HD006

NBWCL = HD012 in 3 categories (0, 1, 2 or more)

INCMA = H0i0830

REGION

WAGE = H0i0760

SELF = H0i0770

PENS = H0i0780

UNEM = H0i790

SOCGR = H0i0800

INVEST = H0i0810

OTHER = H0i0820

ASSIST = H0i0900

EAT = most recent non-missing information of HF007

HAVF = most recent non-missing information of HF008

KWAR = most recent non-missing information of HF003

HOLY = most recent non-missing information of HF004

REPLF = most recent non-missing information of HF005

BUYC = most recent non-missing information of HF006

4.7. IVE imputation of household amount-variables

A sequence of regressions is carried out to impute the following variables:

LH0i0420, LH0i0850, LH0i1060, LH0i1240

with the covariates including all the auxiliary variables (see below) and those variables that have been imputed.

Auxiliary variables:

RANGREV

HHTYP = HD006

NBWCL = HD012 in 3 categories (0, 1, 2 or more)

INCMA = H0i0830

REGION

EQSIZE = HD005

4.8. IVE imputation of wage and salary earnings

A sequence of regressions is carried out to impute the following variables:

P_NG, C_NG_A, C_NG_B, LP0i0610, LP0i0970, LP0i1890

with the covariates including all the auxiliary variables (see below) and those variables that have been imputed.

Auxiliary variables:

RANGREV

REGION

NBWCL = HD012 in 3 categories (0, 1, 2 or more)

AGECLA =

PD003 ≤ 15	1
16 ≤ PD003 ≤ 25	2
26 ≤ PD003 ≤ 35	3
36 ≤ PD003 ≤ 45	4
46 ≤ PD003 ≤ 55	5
56 ≤ PD003 ≤ 65	6
66 ≤ PD003	7

GENDER = PD004

EDUC = PT022

OCCUP

PE006C in (1,2,3)	1
PE006C in (4,5	2
PE006C in (6,7,8)	3
PE006C in (9	4
else	9

INDUST = PE007C

ENTSIZ

1 ≤ PE008 ≤ 7	PE008
1 ≤ PJ009 ≤ 7	PJ009
else	9

STEMP

1 ≤ PE004 ≤ 5	PE004
1 ≤ PJ006 ≤ 5	PJ006
else	9

WORKHH

1 ≤ PE005 ≤ 20	2
21 ≤ PE005 ≤ 34	3
35 ≤ PE005 ≤ 45	4
46 ≤ PE005	5
else	1

SUPERV

PE010 in (1,2)	1
PE010 in (3)	2
else	9

4.9. IVE imputation of personal range-variables

Two separate regressions are carried out to impute the following variables:

RANGSELF and RANGCAP

with the covariates including the auxiliary variables listed below.

Auxiliary variables:

AGECLA =

PD003 ≤ 15	1
16 ≤ PD003 ≤ 25	2
26 ≤ PD003 ≤ 35	3
36 ≤ PD003 ≤ 45	4
46 ≤ PD003 ≤ 55	5
56 ≤ PD003 ≤ 65	6
66 ≤ PD003	7

GENDER = PD004

WORKHH

1 ≤ PE005 ≤ 20	2
21 ≤ PE005 ≤ 34	3
35 ≤ PE005 ≤ 45	4
46 ≤ PE005	5
else	1

EDUC = PT022

OCCUP

PE006C in (1,2,3)	1
PE006C in (4,5	2
PE006C in (6,7,8)	3
PE006C in (9	4
else	9

INDUST = PE007C

PE002 (only for imputing RANGCAP)

NB_SELF (only for imputing RANGSELF)

4.10. IVE imputation of personal amount-variables

A sequence of regressions is carried out to impute the following variables:

LEAROTH, LSHARE, LUNEMP, LOLDAG, LSURVIV, LFAM, LSICK, LP0i2220, LP0i2270, LP0i3240, LP0i3270, LP0i3300, LP0i3340

with the covariates including all the auxiliary variables (see below) and those variables that have been imputed.

Auxiliary variables:

RANGREV

REGION

NBWCL = HD012 in 3 categories (0, 1, 2 or more)

AGECLA =

PD003 ≤ 15	1
16 ≤ PD003 ≤ 25	2
26 ≤ PD003 ≤ 35	3
36 ≤ PD003 ≤ 45	4
46 ≤ PD003 ≤ 55	5
56 ≤ PD003 ≤ 65	6
66 ≤ PD003	7

GENDER = PD004

EDUC = PT022

MSTAT = PD005

OCCUP

PE006C in (1,2,3)	1
PE006C in (4,5	2
PE006C in (6,7,8)	3
PE006C in (9	4
else	9

INDUST = PE007C

ENTSIZ

1 ≤ PE008 ≤ 7	PE008
1 ≤ PJ009 ≤ 7	PJ009
else	9

STEMP

1 ≤ PE004 ≤ 5	PE004
1 ≤ PJ006 ≤ 5	PJ006
else	9

WORKHH

1 ≤ PE005 ≤ 20	2
21 ≤ PE005 ≤ 34	3
35 ≤ PE005 ≤ 45	4
46 ≤ PE005	5
else	1

SUPERV

PE010 in (1,2)	1
PE010 in (3)	2
else	9

CAPNG = P0i3350

EQSIZE = HD005

5. NET/GROSS RATIO FOR HOUSEHOLDS

For each household a net/gross ratio is calculated in order to convert those income components into net that are collected gross. The algorithm is as follows:

Step 1: For each person calculate the sum of all the income components (net as far as possible, gross for self-employment and capital income).

revcons = PI1111 + PI1112 +P0i2220I + P0i3340I + PI123 + PI131 + PI1321 + PI1322 + PI133 + PI134+ PI135 + PI136

Step 2: For each household calculate

(a) the sum of income of all individuals and add the household specific components

$$HHDINC = \left(\sum_{\text{all persons in HHD}} \text{revcons} \right) + HI122G + HI137 + HI138$$

if = 0 then HHDINC = HI200 * 12

(b) the sum of net wages

$$SNWAGE = \sum_{\text{all persons in HHD with P0i1890 I} > 0} P0i1890I + \sum_{\text{all persons in HHD with P0i1890I} = 0 \text{ and } P0i0610I > 0} P0i0610I + \sum_{\text{all persons in HHD with P0i1880I} = 0 \text{ and P0i0970I} > 0} P0i0970I$$

(c) the sum of gross wages

$$SGWAGE = \sum_{\text{all persons in HHD with P0i1880I} > 0} P0i1880I + \sum_{\text{all persons in HHD with P0i1880I} = 0 \text{ and } P0i0600I > 0} P0i0600I + \sum_{\text{all persons in HHD with P0i1880I} = 0 \text{ and P0i0960I} > 0} P0i0960I$$

Step 3: Group the households into 5 groups (single without children, couple without children, single or couple with children aged 16 or younger, other household with maximum 4 persons, other household with at least 5 persons) and calculate the average of HHDINC for these 5 groups.

$$AVG\_HHDINC_{group} = \frac{\sum_{\text{all households in group}} HHDINC}{\text{number of households in group}}$$

Step 4: Calculate the net/gross ratio with the following regression (Assumption: the net/gross ratio depends on the total household income as compared to the average income of similar households.)

$$Y = \log\left(\frac{SNWAGE}{SGWAGE}\right)$$

$$X = \log\left(\frac{HHDINC}{AVG\_HHDINC}\right)$$

Based on all households from a specific country, parameters a, b and c are determined with the following regression equation:

$$Y = a + bX + cX^2$$

$$\Leftrightarrow \log\left(\frac{SNWAGE}{SGWAGE}\right) = a + b * \log\left(\frac{HHDINC}{AVG\_HHDINC}\right) + c * \log\left(\frac{HHDINC}{AVG\_HHDINC}\right)^2$$

and the net/gross ratio is calculated as follows:

HI020 = exp (-a+b*X+c*X²)

$$= \exp\left(-\left(a + b * \log\left(\frac{HHDINC}{AVG\_HHDINC}\right) + c * \log\left(\frac{HHDINC}{AVG\_HHDINC}\right)^2\right)\right)$$

Step 5: Trimming

if HI020 ≤ 0.2 then HI020 = 0.2

if HI020 > 1 then HI020 = 1

6. ADJUSTING HOUSEHOLD INCOME FOR WITHIN HOUSEHOLD NON-RESPONSE (HI140)

In order to have comparable figures at aggregated houshold level, it is necessary to make up for unit non-response if no questionnaire was answered by some persons in the household.

Three countries choose to provide their own estimate for within household non-response, namely Finland, Ireland and the United Kingdom.

For the other countries the following procedure is applied:

The missing income is estimated using other information from interviews (personal income from previous year and/or total household income from current/previous year). This is done in 3 steps as follows:

(1) If the person was interviewed in the previous wave: copy the income from the previous wave. The amount to be copied is PI140= PI111+PI112+PI121+PI123+PI131+PI133+PI134+PI135+PI136.

(2) For households with no change in composition (nobody moving out or in, died or new born), and with a completed household interview in the previous wave: Calculate the difference between HI200*12 from the previous wave and the sum of all known PI140's (including those copied from the previous wave) + HI122+HI137+HI138 of the current wave. If the difference is not negative, it is assigned to HI140. If the difference is negative, HI140 is set to 0. [This results in HI100≥12*HI200 of previous year.]

(3) For households with a change in composition (at least one person moving out or in, died or new born), or without a completed household interview in the previous wave: Calculate the difference between HI200*12 from the current wave and the sum of the PI140's + HI122+HI137+HI138 of the current wave. If the difference is not negative, it is assigned to HI140. If the difference is negative, HI140 is set to 0. [This results in HI100≥12*HI200 of current year.]

Further reading: Doc. PAN 175/2002-02

7. AGGREGATING PERSONAL INCOME WITHIN A HOUSEHOLD

The income components collected at personal level are aggregated over all interviewed persons in the household.

Thus the following variables are created at household level:

HI1111 = Σ PI1111

HI1112 = Σ PI1112

HI112 = Σ PI112

HI121 = Σ PI121

HI123 = Σ PI123

HI131 = Σ PI131

HI1321 = Σ PI1321

HI1322 = Σ PI1322

HI133 = Σ PI133

HI134 = Σ PI134

HI135 = Σ PI135

HI136 = Σ PI136

HI211M = Σ PI211M

HI211MG = Σ PI211MG

8. ASSIGNING HOUSEHOLD INCOME COMPONENTS TO INDIVIDUALS

The income components collected at household level are shared among all the eligible persons in the household. The value is divided by the number of personal interviews completed in the household and by the within household non-response inflation factor.

PI122A = HI122 / HD002

PI137A = HI137 / HD002

PI138A = HI138/ HD002

9. IMPUTATION INDICES (HI…X)

In order to describe for each household the share of income that has been imputed using the IVE software, the sum of all income components which are known before running the IVE procedures is compared to the total income after IVE-imputation and after applying the within household non-response inflation factor.

Note that any information forwarded from preceding waves - including imputation in previous waves - is considered as being known before running the IVE procedure.

9.1. Indices for variables declared at household level

For variables declared at household level, the imputation index is calculated as follows:

$$HI122X = \frac{HI122 - H0i1240E}{HI122}$$

$$HI137X = \frac{HI137 - H0i1060E * H0i0930I}{HI137}$$

$$HI138X = \frac{HI138 - H0i0420E * H0i0430I}{HI138}$$

9.2. Indices for variables declared at individual level

For variables declared at individual level, the imputation index is calculated as follows:

In a first step, the sum over of all components at personal level (know before running the IVE imputation) is calculated over all interviewed persons in the household. This amount is then compared with the result after imputation.

$$HI131X = 1 - \frac{\sum_{\text{all interviewed persons in the household}} P0i2320E * P0i2330I + P0i2350E * P0i2360I + P0i2380E * P0i2390I + P0i2410E * P0i2420I + P0i2440E * P0i2450I}{HI131}$$

10. ADAPT THE ALGORITHM FOR THE INITIAL WAVE OF A COUNTRY

The algorithm above describes the imputation of a wave which is not the initial wave for a country.

When the initial wave of a country is to be imputed, two waves should be available in order to avoid too many missing values.

10.1. When an amount or a range can be specified

The algorithm is adapted because no imputed values from the previous wave are available. In this case, values provided in the following wave are used to replace missing values in the initial wave (if both value and approximate range are missing). However, as the following wave has not been imputed yet, and if no information is available from the current wave (i.e. neither a value nor an approximate range) but an approximate range is provide in the following wave, the missing approximate range for the first wave is replaced by the approximate range of the following wave.

10.2. When an annual or a monthly amount can be specified

For the initial wave, annual amounts from the following wave have to be converted into monthly amounts. To do so, the imputed number of months for the initial wave is used.

10.3. Net/gross ratios

Net gross ratios for the following wave have to be calculated, if they are to replace missing ratios in the initial wave.

11. BIBLIOGRAPHY

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