



## **Collection, construction and plausibility checks of income data in the Swiss Household Panel**

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## 1 Introduction

The module on income in the Swiss Household-Panel (SHP) is to provide reliable data on yearly individual and household income. It should be noted however that the SHP is not a socio-economic Panel, and income is one subject among many others in the SHP. Since the first wave of the SHP in 1999, a few changes in the collection of income-data have been introduced mostly in order to improve quality. However, in spite of these changes it is very important in the SHP not to change the underlying concepts and keeping the comparability of data between the different waves.

In this documentation we describe how data on income is collected, how yearly income is calculated and which plausibility checks and corrections are carried out. Changes in these processes between different waves of the SHP are explicitly presented. The first chapter gives a very brief introduction to the concept of income in the SHP and presents the questions on income asked the respondents. The second chapter looks at the different income sources. The third chapter describes the collection of income data in more detail and lists the changes in the questionnaire that have been introduced between W1 and W8. The fourth chapter documents how information is collected and how the annualised (individual) income variables in the user files are constructed in more detail. In chapter five we present the plausibility checks undertaken to enhance the quality of the provided data. Chapter six describes the procedures for household income. Some parts of this documentation are based on earlier reports on income data in the SHP.<sup>1</sup>

Although only income variables available in the SHP user files are described in this documentation, we'd like to point to some supplementary (SHP-) data on income available:

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<sup>1</sup> They can be downloaded at : <http://www.swisspanel.ch/doc/methodology.php?lang=en&pid=8> and provide further details.

- The SHP cross-national equivalent file (CNEF)<sup>2</sup> contains income sources defined slightly differently than in the SHP user file. All variables - with the exception of professional income - , report income on the household level. For all CNEF-variables, imputed values are available in case information was missing. A contract for CNEF-variables can be downloaded from [www.swisspanel.ch](http://www.swisspanel.ch).
- The annualised income variables of the SHP user files have been imputed for all income sources if the amount was missing (don't know, no answer, implausible value). These imputed values are available from the SHP-team on demand and will be included in the user files in later versions of the SHP user files.

## 2 Concepts

Income questions may refer to resources or expenses. The SHP emphasizes the resource questions and includes only a few questions concerning expenditure on the household level (taxes, rent of accommodation, financial obligations). Only monetary income sources are considered in the SHP.

Income is primarily collected on the individual level. All respondents of the individual questionnaire (household members aged 14 and over) are asked about their personal income. On the household level, only total household income is asked. Personal income is collected in two different ways:

- A global assessment of income. Although not explicitly stated, the question can be interpreted as asking about income in the moment of the interview:  
“Can you tell me what is your personal total monthly income, everything taken into account? Think about all the sources of personal income: professional income, old age pension, welfare, pensions, grant, maintenance allowance, income from capital - for example interest, shares or income from rentals. If it is easier, you may also indicate your yearly income.”
- A series of questions about specific income sources, e.g.:  
“Since (month-year) have you received a professional income as an employee?”  
And if the answer is yes:  
“Could you tell me how much you have earned from this activity per month (if it is more convenient, you can also indicate your income per year)?”  
If the answer for the amount is missing (no answer, don't know), the respondent is asked to give an estimate.

## 3 Income sources

The questions concerning the sources of income in the individual questionnaire can be divided into five main categories:

- (1) Working Income (from employment or from self-employment)
- (2) Old age and disability pension
- (3) Social public transfer income (income from institutions)
- (4) Income from private persons
- (5) Other sources

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<sup>2</sup> <http://www.human.cornell.edu/che/PAM/Research/Centers-Programs/German-Panel/cnef.cfm>

From wave 1 to wave 3, one question for each of these categories was asked. In wave 1, the question on old age or disability pension was not included in the questionnaire. From wave 4 on, the number of questions on income sources has been further increased:

- Old age and disability pension: separate questions for
  - o first pillar old age pension
  - o second pillar pension
  - o invalidity pension
- Income from institutions: separate questions for
  - o unemployment funds
  - o social assistance,
  - o grants or scholarships
  - o other institutions.
- Income from private persons: separate questions for
  - o persons from inside the household
  - o persons from outside of the household

Since wave 6, family or child allowances are asked specifically. Figure 1 shows the question on income sources that have been asked in each wave. The shades represent the categories described above. The name of the corresponding variable in the user data file is included in parenthesis.

W1	W2 - W3	W 4-W5	W6 - W8
Employment and self-employment (i\$\$wy)	Employment and self-employment (i\$\$wy)	Employment (i\$\$empy) self-employment (i\$\$indy)	Employment (i\$\$empy) self-employment (i\$\$indy)
-	AHV, IV, Pension (i\$\$vasy)	(old age)pension (i\$\$oasiy) invalidity pension (i\$\$aiy) pension insurance (i\$\$peny)	(old age)pension (i\$\$oasiy) invalidity pension (i\$\$aiy) pension insurance (i\$\$peny)
social public transfers (i\$\$stpy)	social public transfers (i\$\$stpy)	unemployment fund (i\$\$uney) social assistance (i\$\$wely) grants, scholarships (i\$\$gray) other institutions (i\$\$osy)	unemployment fund (i\$\$uney) social assistance (i\$\$wely) grants, scholarships (i\$\$gray) other institutions (i\$\$osy) family or child allowances (i\$\$famy)
social informal transfers (i\$\$stfy)	social informal transfers (i\$\$stfy)	private transfers (inside hh) (i\$\$pihy) private transfers (outside hh) (i\$\$pnhy)	private transfers (inside hh) (i\$\$pihy) private transfers (outside hh) (i\$\$pnhy)
other sources (i\$\$osy)	other sources (i\$\$osy)	other sources (i\$\$osy)	other sources (i\$\$osy)

**Figure 1 : Income sources collected in the SHP**

With the exceptions of family allowances and other income sources (only in W1), these further distinctions pose no problem for the comparability of the variables collected in W1 to W3 with later waves. These variables can be constructed from W4 on by aggregating different income sources.

As no information on old age pension was collected in W1 we don't know whether respondents have included them in other income sources, in social public transfers or haven't included them in any income source asked for. Also for family and child allowances it is not clear into which category respondents have included them up to W5. Since they are part of the

federal social security system, they are present a public transfer and should have been reported as part of “income from (other) institutions”. But because they are linked to employment and transferred together with the salary, they are often included in income from employment.<sup>3</sup> They might also have been included in the category “other income” or might not have been reported at all.

## **4 Collection of income data**

Some changes in the method of data collection were introduced between W3 and W4 as well as between W5 and W6. As a consequence, three different periods of collection of income data can be distinguished. For clarity reasons we describe the method of income collection for each of these periods separately, even though this leads to some repetitions. Subsequently, changes introduced between these periods are listed explicitly.

### **4.1 W1 to W3**

The total yearly personal income in the Swiss Household Panel (SHP) is built on the comparison of two distinct ways of collecting information on income: in a first step, a global assessment of the total personal income was asked about. In a second step, the respondents were asked about income from various sources (see chapter 1 for the question wordings). Ideally, the sum of the various sources should correspond to the assessment of total global personal income.

In case of income from employment or self-employment the following information is asked additionally:

- whether the given income is a net or gross amount
- the number of month since the last interview on which the respondent has received this income
- whether the respondent has been paid a 13<sup>th</sup> or 14<sup>th</sup> month salary, a bonus or a gratification

It was only possible to declare income either from employment or from self-employment (according to the main activity). Persons not in the labour force or unemployed at the time of the interview weren't asked about income from employment or self-employment, even though they could have been receiving such an income in the previous month.

In case of income from old age or invalidity pensions the number of months the respondent has received this income is also asked.<sup>4</sup>

### **4.2 W4 to W5**

Total yearly personal income is built on the comparison of two distinct ways of collecting information on income (as from W1 to W3): in a first step, a global assessment of the total personal income was asked about. In a second step, the respondents were asked about income from various sources (see chapter 1 for the question wordings). Information on the number of months (since the last interview) an income has been received is asked for each income

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<sup>3</sup> From wave 6 on, respondents have been asked specifically whether they included family allowances in the amount of income from employment. In wave 6 for example, this was the case for 55% of the respondents receiving family allowances.

<sup>4</sup> This doesn't apply to W1 as there was no specific question about old age or invalidity pension.

source. Ideally, the sum of the various sources should correspond to the assessment of total global personal income.

In case of income from employment or self-employment the following information is asked additionally:

- whether the given income is a net or gross amount
- whether the respondent has been paid a 13<sup>th</sup> or 14<sup>th</sup> month salary, a bonus or a gratification

#### 4.3 W6 to W8

In a first step, respondents are asked about income from various sources (see chapter 1 for the question wordings). Information on the number of month (since the last interview) an income has been received is asked for each income source.

In case of income from employment or self-employment the following information is asked additionally:

- whether the given income is a net or gross amount
- whether the respondent has been paid a 13<sup>th</sup> or 14<sup>th</sup> month salary, a bonus or a gratification
- whether child allowances (if present) have been included in the amount given

Only if information on at least one income source is missing (“no answer” or “don’t know”), the respondent is asked to report his total yearly income (see chapter 1 for the question wording).

#### 4.4 Changes between W3 and W4

The following changes (for changes in income sources, see chapter 2) have been introduced between W3 and W4:

W1 – W3	W4 – W8
Only the economically active are asked about working income. Only income from either employment or self-employment can be reported (according to main activity).	All respondents are asked about income from employment and about income from self-employment (independent of their current working status).
Information on the number of months an income has been received is only collected for <ul style="list-style-type: none"> <li>- income from employment or self-employment and</li> <li>- income from old age or invalidity pension.</li> </ul>	Information on the number of months an income has been received collected for all income sources.

#### 4.5 Changes between W5 and W6

The following changes have been applied between W5 and W6 (for changes in income sources, see chapter 2):

W1 – W5	W6– W8
All respondents were asked about their total	Only respondents with missing information

personal income before questions about different income sources are asked.	on at least one income source are asked about total personal income.
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## 5 Construction of annualised income on personal level

The aim of the construction of the yearly income variables is to get at an estimation of income received in the 12 months before the interview.

### 5.1 Construction of a yearly income

For each individual income source and total personal income, the first step consists in constructing a yearly income. If income has been declared on a monthly basis, the amount is multiplied by 12. If the income has only been received during parts of the year, yearly income is constructed according to a coefficient calculated on basis of the number of months the income has been received. The coefficient is calculated by the ratio of the number of months an income has been received to the interval between the two interviews.<sup>5</sup>

### 5.2 Professional income

In case a 13<sup>th</sup>, 14<sup>th</sup> monthly salary or a bonus has been received, these amounts are added to the yearly income from employment or self-employment according to the following rules:

- One monthly salary if the respondent declared to receive any (but only one) of the following: 13<sup>th</sup> month salary, bonus, or gratuity.
- Two monthly salaries if the respondent either declared to receive a 14<sup>th</sup> month salary or both a 13<sup>th</sup> month salary and a bonus or gratuity.
- Three monthly salaries if the respondent either declared to receive a 14<sup>th</sup> month salary and a bonus or gratuity.
- No additions if professional income has been declared on a yearly basis (it is assumed that these additions are already included in the total amount declared).

Respondents who declare a change in their working status since the previous interview are asked to give their working status during each month by month in the activity calendar. This information is used to compute the percentage of time spent in each of the five following statuses:

- working full-time (37 hours or more per week)
- working part-time (19-36 hours per week)
- working low-time (1-18 hours per week)
- unemployed
- other

For the respondents who declared no change, their working status at the time of the actual interview is considered to be their status during 100% of the elapsed time since the previous interview. For those respondents having declared a change, an hourly wage is computed from actual occupation rate and work income. The computed hourly wage is multiplied by the percentage spent in each working status, using the following assumptions: average low-time work is 9 hours a week, average part-time work is 28 hours a week and average full-time work is 42 hours a week.

<sup>5</sup> For the calculation of the coefficient both the direct question on the number of month and the activity calendar are taken into account. If two different coefficients are available the higher of these two coefficients is used.

Example for changes in the employment status:

A respondent works 40 hours a week at the time of the W2 interview, and is earning 4'000 CHF a month. He receives a 13 month salary and bonus. The interval since the previous interview is 14 months. During this period, the respondent worked 2 months low-time, 6 months part-time and 6 months full-time.

<b>Declared monthly work income [A]</b>		4000
<b>Annualized work income [B]</b>	[A]*12	48000
<b>Extra salaries and bonus [C]</b>	[B]*(2/12)	8000
<b>Annualized work income including extra salaries and bonus [D]</b>	[B]+[C]	56000
<b>Hours worked weekly at time of interview [E]</b>		40
<b>Annualized number of hours [F]</b>	[E]*52	2080
<b>Hourly wage</b>	[D]/[F]	26.9

As shown in the following table, the constructed work income that takes account of the information from the activity calendar leads to a smaller amount compared to the annualised work income calculated using only the situation at the time of the W2 interview (42563 vs 56000 CHF).

Occupation	Number of months	% time	Average hours worked weekly	Average hourly wage in CHF	Amount earned
Low-time	2	14%	9	26.9	1798
Part-time	6	43%	28	26.9	16786
full-time	6	43%	40	26.9	23979
<b>Total</b>	14	100%	30.4	26.9	42563

The main problem for income variables presenting a status quo of the information at one point in time is the implicit assumption that those respondents answering with monthly information did not experience any change in the preceding year (given that the yearly income is regarded to cover the preceding year). Such changes may concern a change in the different sources of income or a change of the level of income in one or more sources. For instance, a respondent who worked 6 months half-time for CHF 2000 and then moved to a 100% work rate with a CHF 4000 wage can declare his monthly work income at the time of interview (CHF 4000) and answer that he received this income during 6 month. In this case, the income received during six months of part-time work is not declared.

In W2 and W3, unemployed persons haven't been asked whether they received an income from employment or self-employment in the previous year (see chapter 3). If an unemployed person at the time of the interview declares a total personal income but no income in the detailed questions regarding the different sources (other than work income because unemployed persons were not asked about their work income), we assume that the total income comes from previous work if the work calendar indicates that this person has worked during the year preceding the interview. In this case, if the total income is declared as a monthly amount, it is recomputed taking into account the number of months it was received according to the respondent's indications.

### 5.3 Gross and net income

For total personal income and work income, the amount given by the respondent can be either net, gross or estimated. The amounts given for all other income sources are considered as net amounts (net of social security contributions). Social security contributions for work income are computed using the following rules:

W1 – W8: Old age and disability insurance, non professional accident insurance, unemployment insurance and second pillar:

- Men and women aged 16 to 24 working more than 12 hours/week: 1.5% contribution
- Men aged 25 to 64 / women aged 25 to 63<sup>6</sup> and yearly prof. income < 19890<sup>7</sup> CHF: 8% contribution for social insurance
- Men aged 25 to 64 / women aged 25 to 63<sup>8</sup> and yearly prof. income ≥ 19890<sup>9</sup> CHF: 19% contribution (8% social insurance, 11% second pillar)
- Men aged 65 and more, women aged 64<sup>10</sup> and more and yearly prof. income ≥ 16800: 8% contribution.

Net income is given by subtracting social security contribution from gross income (and the other way round).

## 6 Plausibility checks of personal income variables

After having constructed these yearly income variables, they pass a series of plausibility checks.

From W1 to W5, the basic problem results from the fact that information on total personal income is collected in two different ways: by asking total personal income directly and by adding information on the different income sources. In various cases, these two amounts don't correspond. We allow an error of +/- 15% between the sum of the different income sources and total personal income. If the difference amounts to more than 15%, a number of tests is carried out in order to detect the cause of this difference and to correct for it. However if this is not possible, the total of the variables is set to a missing value (-8).

From W6 on, this double information on total personal income is not available any more. Total personal income is calculated by adding the different sources. If information on at least one income source is missing, the total personal income (asked in case of a non response) is taken. As a consequence of this change in the method of data collection, some checks of compatibility carried out from W1 to W5 are not necessary or not possible any more.<sup>11</sup>

The checks on the variables carried out are now described in further detail. For each check we indicate the waves of the SHP concerned.

### A. Working income missing

Some individuals didn't declare any income from employment or self-employment although they reported to be economically active. Up to W6, this problem is most likely due to the fact that the question was incomprehensible to the respondent. They understand the question about total income concerning professional income and the following question "Can you tell me the amount of your total monthly professional income and all other incomes from paid activities?" is then understood in the sense of an additional income. A detection and correction is carried out in the following way: if a person has declared a total personal income but didn't declare any specific income source and if this person was economically active

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<sup>6</sup> Up to W7 the retirement age of women was set to 62 according to previous legislation.

<sup>7</sup> Up to W7 this level was set at 19890 CHF according to previous legislation.

<sup>8</sup> Up to W7 the retirement age of women was set to 62 (contributions up to 61) according to previous legislation.

<sup>9</sup> See note 7

<sup>10</sup> See note 7

<sup>11</sup> As the same program as in previous waves is used however, all data for each respondent still pass these checks and help sometimes to detect irregularities.

during all the year, the professional income is considered to be equal to total income. From W6 on, this problem is less likely to occur and corrections as described above are not possible any more.

#### B. Correction of typing mistakes

When collecting income variables, typing mistakes are inevitable. They can have different causes:

- An zero too much or too less
- Declaration of a monthly reference period if in fact a yearly income has been given (or the other way round)

Checks for such mistakes are primarily effectuated directly at the survey agency. In the process of plausibility checking in the SHP, the programme tries to detect such mistakes automatically up to W5. Some mistakes the program couldn't detect are corrected manually. From W6 on, these mistakes have only been corrected in manual controls. However, as only one source of information about total personal income is available, the detection of such mistakes has become more difficult.

#### C. Omission of an income source in the total income declared

Two types of omissions are encountered quite frequently:

- Total income declared corresponds to the professional income or the old age pension. However, when asked about income sources specifically, other income sources are also declared.
- Total income declared doesn't include certain income sources if they have been received during only part of the year or in an irregular way.

If total income is equal to one of the income sources, we add the other income sources to the total income originally declared. However unique amounts of income greater than 12000 CHF are not taken into account as they are considered as wealth and not as income.

From W6 on this check can only be applied to cases where information on at least one income source was missing and therefore total personal income has been asked.

#### D. No total personal income declared, but declaration of some income sources

This problem is most likely linked to the fact that most individuals – asked about their total income – associate this with professional income. So often someone having declared to have no income, when asked about specific income sources, some amounts are declared. In this case, total income is corrected and replaced by the sum of the different income sources declared. This test is carried out from W1 to W5.

#### E. Gross or net income

A difference of the sum of income sources and total income (from W1 to W5) can also be linked to the fact, that for one or more income sources gross amounts have been declared while for other net amounts have been given. After having calculated net amounts for all income sources, tests of coherence are repeated. This test is carried out from W1 to W5.

#### F. Mark extreme income

Extreme income is marked for manual controls. Extreme income is declared in the following way:

- Yearly income less than 100 CHF for individuals of at least 18 years of age
- Yearly income above 500'000 CHF
- Yearly income less than 5000 CHF for individuals living by themselves

#### G. Comparison with previous waves

If the difference between income from a previous wave and the current wave exceeds a given amount, manual checks are performed.

#### H. Total personal income = sum of partner's and own income

The notion of pooling all the income sources, leads some respondents to answer that they dispose of the totality of their household income, i.e. their own and their partner's income as well. In this case the sum of individual income sources is applied. This test is less important from W6 on as this problem is then less likely to occur.

#### I. Manual corrections

After corrections have been effectuated by the programme, these automatic corrections are verified manually, and all income with inconsistencies detected are tried to be corrected manually.

In wave 1, there was an additional problem concerning old age pension, as this income source has not been demanded specifically. Therefore, information for old age pension was sometimes found in the category work income, sometimes it was in the global total income only. Where old age pension could be identified it was excluded from work income.

## 7 Construction and plausibility checks of household income variables

Household income is collected in the household questionnaire. If only one person of 14 years or over is living in the household however, no question about total household income is asked and the information is taken from the individual income variables, if the latter are consistent. For all other households the following checks are carried out:

#### A. Comparison total household income with sum of individual income

In all households (with at least two persons 14 years of age or older), available total annual incomes from the household members are added and the sum is compared to total HH income. For the addition of individual income, income from other household members is not taken into account from W4 on.<sup>12</sup> If total household income deviates not more than 15% from the sum of individual incomes, household income is replaced by the sum of individual income (including extra salaries and bonus).

#### B. Person without income having declared the partner's income as his/her own:

If the sum of individual income is more than 180% of the declared household income, it is checked whether a household member has declared the income of another household member as his/her own. This is considered to be the case if a person declared a total personal income not reported in the different income sources. If such a problem has been detected, step A is repeated.

#### C. Comparison total household income with sum of individual income sources

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<sup>12</sup> From W1 to W3 this was not possible, as income from persons outside of the household and income from person inside the household have not been distinguished.

If household and individual incomes are still incoherent, we calculate the sum of all income sources considered as being plausible. Again, income from other persons inside the household is not taken into account.

- If the sum of income sources of all household members having completed the individual questionnaire is higher than to the reported total household income, household income is replaced by the sum of the income sources.
- In case of non-response on household income and if individual income of all household members is available and plausible, household income is replaced by the sum of all individual income.

If household and individual incomes are still incoherent, the following rules apply:

- If the sum of individual income is higher than the declared household income (by more than 15%):  
A first check is performed to see if, at the individual level, someone declares the household's head income as his or her own income (typically, a professionally non-active wife responds her husband's income as her own income, see 7). To detect such cases, the following criteria are used:
  - o Sum of individual incomes exceeds the total household income by more than 180%
  - o An individual declares a total income but no detailed income from any other source

If, after this check, the sum of all available individual income sources remains greater than the total household income, it is considered as more reliable and the household income is replaced (even if not all individual incomes in the household are available).

- If the sum of individual income is smaller than the declared household income (by more than 15%), the household income provided in the household questionnaire remains unchanged.