Schweizer Haushalt-Panel
Panel suisse de ménages
Swiss Household Panel

Documentation

of income data

in the Swiss Household Panel:

Collection, Construction and Checks

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1 Introduction

The aim of the module on income in the Swiss Household-Panel (SHP) is to provide reliable data on yearly individual and household income. In this documentation, we describe the collection of income data, the preparation of variables in the User Files as well as checks and data editing carried out. It also presents changes in these processes that have taken place since the start of the panel. Some parts of this documentation are based on earlier reports on income data in the SHP.

Section 2 gives a very brief introduction to the concept of income and questions asked in the interviews. Section 3 describes income data at the individual level, focusing on checks, data editing and changes in the collection of income-data over time. Changes in the data collection have been introduced mostly in order to improve quality, but have implications for the comparison of income over time. Section 4 describes household income variables. Section 5 contains information of the inclusion of the SHP III sample in 2013.

This documentation describes income variables in the SHP user files (shp$$_p_user, shp$$h_user). Supplementary (SHP-) data on income available (but not included in the user files):

- CNEF-variables: The SHP cross-national equivalent file (CNEF) contains income concept slightly different than in the SHP user file and mostly at the household level. While the CNEF data file offers some additional information (e.g. imputed rent, social security distribution), the main difference is that household level variables are constructed by adding individual income information of all household members. All missing income sources for item non-response (individuals who participated but have missing income variable) and partial unit non-response (individual did not complete the individual interview) have been imputed, and household-income reported in the household questionnaire is not taken into account. CNEF-variables are distributed by the Ohio State University (http://cnef.ehe.osu.edu) and are included in the SHP data diffusion on SwissUbase in separate files (folder CNEF).
- Imputed income: The annualised income variables of the SHP user files have been imputed for item non-response for all income sources of the

questionnaire (do not know, no answer, implausible value).[1] Files that include imputed income are included in the SHP data diffusion on SwissUbase in separate files (folder imputed_income_wealth).

- Consumer price index: All income variables provided in the SHP files are nominal values. Consumer price indexes provided by the Swiss Federal Statistical Office are included in the long files for imputed income (imputed_income_hh_long_shp; imputed_income_pers_long_shp) for different base years: the variables are named cpi2000, cpi2005, cpi2010, cpi2015 and cpi2020.
- Original survey answers: The income variables in the user files are constructed and checked, referring to annual or monthly income. Original responses on the questionnaire (see individual and household questionnaires for details) are available from the SHP-team upon request.
- Additional samples SHP-Lives Vaud (2013-2018) and SHP-Lives cohorts (2013-2019) contain mostly the same income variables as the SHP samples.

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 (rent of accommodation, financial obligations, taxes in some years). Only monetary income sources are considered in the SHP.

Income is primarily collected at the individual level. All respondents of the individual questionnaire (household members aged 16 and over)[2] are asked about their personal income, distinguishing several income sources.

For example, for income for employment, the question is:

[1] For the taxes and disposable income, pre-tax income is simulated simulations are performed on imputed pre-tax income imputed values are not provided. For some income sources (income from employment, income from self-employment, occupational pension, capital income), imputed values are within income brackets indicated by respondents.

[2] Until 2009, income questions were asked from age 14 on.

> “Since (month-year of the last interview) 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)?”

Although not explicitly stated, the question can be interpreted as asking about income at the moment of the interview. Respondents may indicate either monthly or yearly amounts, gross or net income. For some income sources, respondents are asked to provide an estimate of their income if they did not indicate an income amount (no answer, don't know).

A global assessment of income (total personal income) has been collected during all individual interviews until 2003, and since 2004 only for individuals with at least one item-non response. The question is:

> “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”.

On the household level, only total household income (including all income sources and all household members) is asked. Again, respondents may indicate monthly or yearly amounts, gross or net income.

3 Individual income

3.1 Income components

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) Pensions (old age, disability, widowhood)

(3) Public transfer income (income from institutions)

(4) Income from private persons

(5) Capital income/other sources (capital income, income from rents, inheritance, 3rd pillar)

At the beginning of the SHP, only one question for each category was asked, more detailed questions separating income sources were introduced in later waves. Table 1 gives an overview over question on income sources 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 (1999)	W2 - W3 (2000-2001)	W4-W5 (2002-2003)	W6 – W15 (2004-2013)	Since W16 (since 2014)
Employment and self-employment (i$$wy)	Employment and self-employment (i$$wy)	Employment (i$$empy)	Employment (i$$empy)	Employment (i$$empy)
		Self-employment (i$$indy)	self-employment(i$$indy)	self-employment (i$$indy)
-	AVS/AI Pension (1st pillar) (i$$avsy)	AVS pension (1st pillar) (i$$oasiy)	AVS/AI pension (1st pillar) (i$$oasiy)	AVS/AI pension(1st pillar) (i$$oasiy)
		disability pension (i$$aiy)	disability pension (i$$aiy)	disability pension (i$$aiy)
		2nd pillar pension (i$$peny)	2nd pillar pension (i$$peny)	2nd pillar pension (i$$peny)
public transfers (i$$stpy)	public transfers (i$$stpy)	unemployment (i$$uney)	unemployment (i$$uney)	unemployment (i$$uney)
		social assistance (i$$wely)	social assistance (i$$wely)	social assistance (i$$wely)
		grants, scholarships (i$$gray)	grants, scholarships (i$$gray)	grants, scholarships (i$$gray)
		other institutions (i$$insy)	other institutions (i$$insy)	other institutions (i$$insy)
			family or child allowances (i$$famy)	family or child allowances (i$$famy)
Social informal transfers (i$$stfy)	social informal transfers (i$$stfy)	private transfers (inside hh) (i$$pihy)	private transfers (inside hh) (i$$pihy)	private transfers (inside hh) (i$$pihy)
		private transfers from other hh (i$$pnhy)	private transfers from other hh (i$$pnhy)	private transfers from other hh (i$$pnhy)F
other sources (i$$osy)	other sources (i$$osy)	other sources (i$$osy)	other sources (i$$osy)	Capital income (i$$capy) Rental income (i$$renty) Other income (i$$othy)

Table 1 : Income sources collected in the SHP

There are some important changes which affects the comparability between waves:

- Old age pension in W1: No information on old age pension was collected in wave 1. We do not know how respondents have reported such pensions (not reported, part of other income, part of public transfers, part of total income). In some cases, it is therefore advisable to exclude wave 1 from analysis of income data.
- More detailed questions from 2002 (wave 4) on: income components of the different categories are collected in more detail. With the exception of family allowances (see below), the more detailed questions should allow the comparability between waves. Variables from wave 1 to W 3 (i$$wy, i$$stpy, i$$stfy) can be constructed by aggregating different income sources from later waves and are included in the User Files for all waves (but see the next point for employment income). However, once income components are asked in more detail, total income tends to increase.
- Employment income: From 1999- 2001 it was only possible to declare income either from employment or from self-employment (according to the main activity). Persons not in the labour force or unemployed at the time of the interview have not been asked about income from employment or self-employment, even though they could have been receiving such an income in the previous month. Since 2002, all respondents are asked about income from employment and about income from self-employment (independently of their current working status).
- More detailed questions from 2014 (wave 16) on: income from other sources is collected in more detail. While from 1999 to 2013 one question on other income sources has been asked (i$$osy), information on capital income (i$$capy), income from rents (i$$renty) and other income (i$$othy) are collected separately from 2014 on. The variable i$$osy is the aggregate of these three separate variables (i$$osy=i$$capy + i$$renty + i$$othy).
- Family allowances (i$$famy): A question on family allowances has been introduced in 2004 (wave 6). Although family allowances are part of the federal social security system, they are paid by the employed with the salary and therefore often included in income from employment. Therefore, respondents

are asked since 2004, whether the family allowances are included in the employment income indicated.[3] From 1999-2003, family allowances were not collected specifically, they might have been included in the salary, as part of "income from other institutions", as part of other income, or be reported at all.

- Number of month income received: If respondents report their monthly income, they are generally asked on the number of month they received their income. However, from 1999-2001, information on the number of months is only collected for income from employment or self-employment (i$$wyn, i$$wyg) and income from old age or disability pension (i$$avsy). Since 2002, the number of months is collected for each income component.

3.2 Construction of annualised income variables

The aim of the construction of the yearly income variables is to get at an estimation of income received since the interview, standardised to yearly amounts.[4] For each individual income source and for 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 adapted according to the share of the time span, where 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. Additionally, information from the activity calendar is taken into account.[5]

3.3 Construction of income from employment and self-employment

Bonus and 13th month

In case of income from employment or self-employment, respondents are asked about a 13th or 14th month salary, a bonus or a gratification. Amounts are added to

[3] In wave 6 for example, this was the case for 55% of the respondents receiving family allowances.

[4] Respondents who did not participate in the survey the year before, are asked about in come in the 12 months preceding the interview.

[5] Two separate coefficients are calculated: from the number of month of income received since the last interview and from the activity calendar (for employment, self-employment and unemployment income). If both are available, the higher coefficient is used, but constructed data go through a series of plausibility checks.

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: 13th month salary, bonus, or gratuity.
- Two monthly salaries if the respondent either declared to receive a 14th month salary or both a 13th month salary and a bonus or gratuity.
- Three monthly salaries if the respondent either declared to receive a 14th 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).

Gross and net income

For total personal income and work income, the amount given by the respondent can be either as net, gross or estimated. To indicate both gross and net income for each respondents, social security contributions (difference between gross and net income) are simulated. Net income refers to salary received by employees or self-employed. For net income amounts, social security contributions are deducted, but not direct taxes and health care premiums (which are paid separately be individuals).

The various social security contributions (difference between gross and net income) were simulated at the basis of the following assumptions: consists of contributions for old age and disability insurance, non-professional accident insurance, unemployment insurance and second pillar:

- accident and disability insurance by employer: individuals aged 16 to 24 working more than 12 hours/week: 1.5% contribution of gross income
- First pillar old age and disability insurance (statutary pensions): Individuals from 18 years on: contribution defined by legislation: 6.5% contribution of gross income. Individuals above retirement age have to pay the contribution if their income exceeds a threshold (ca 16,800, but varying over years).
- Second pillar old age and disability insurance (company pension plan): Individuals between 25 to retirement age and yearly prof. income above

threshold defined in legislation (ca 20,000 CHF per year, but varying over time): 11% of gross income.

Change in working status

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.

To illustrate how changes in the employment status are treated, we consider an example.

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.

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

As shown in the following table 2, the constructed work income using information from the activity calendar leads to a smaller amount compared to the annualised work income 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
Total	14	100%	30.4	26.9	42563

Table 2 : Illustration of wage computation with activity change

The main problem for income variables presenting a status quo of the information at one point in time is the implicit assumption that 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 more sources. For instance, we consider a person who changed job after 6 month and increased his salary from 4000 CHF to 8000 CHF. He indicates to earn 8000 CHF during 6 month. In this case, the lower income received during six months is not declared.

In W2 and W3, unemployed persons have not been asked whether they received an income from employment or self-employment in the previous year (see section 2). 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.

3.4 Monthly employment and self-employment income

The principal aim of the collection of income in the Swiss Household Panel (SHP) was to provide income on a yearly basis. Although the SHP does not ask explicitly about monthly income from employment and self-employment, it is possible to construct monthly income variable at the basis of the information available in the

survey. The gross and net amounts are calculated at the basis of the same assumptions as for the yearly income variables.

For income from employment, about 78 percent of respondents choose to report their salary on a monthly basis (the rest reports annual income). For income from self-employment, about 42 percent report their monthly income.[6]

If respondents indicate their income on a monthly basis, this amount is taken for the monthly variable. If extra month salaries or bonuses have been declared, 1/12 of the assumed bonus has been added to the reported income amount.

For respondents who reported yearly income amounts, the situation is more complex. They may not have worked during the entire year or they may have changed their income level during the year. Unfortunately, we do not know whether the yearly income reported refers to the yearly income level at the moment of the interview (as implicitly intended in the question wording) or whether the yearly amount represents an average over different income levels received during the year.

The transformation of yearly amounts to monthly income is particularly problematic if respondents have changed their jo. The yearly income amount may reflect an average over the old and the new jobs. There is a similar problem if respondents have not worked during the entire year. As a consequence, we only report monthly income for individuals who indicated yearly amounts if their work situation was stable since the last interview. Monthly income is set to missing if individauls have changed jobs or working status d since the previous interview (or in the last 12 month)[7]. If income has been provided on a yearly basis and neither working status nor jobs have changed, the monthly income simply amounts to the yearly income amount divided by 12.[8]

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[6] Ca. 39 percent report their income from self-employment on a yearly basis. The rest involves irregular income, one-off payments or no answer.

[7] This information is provided in the variable p$$w18 in the individual user file of the SHP.

[8] Instead of the original answers, the constructed yearly income (i$$empy and i$$indy from the user file) have been taken for this procedure, because the constructed variable has already passed a number of plausibility checks and has been corrected for clear mistakes in the original codes.

For the construction of monthly employment income, family allowances are deducted if they have been included in the employment income. Before 2004, no such adjustment for family allowances could be made.

The monthly income amounts obtained are subjected to a series controls described in Table 3 (mostly relating to high or low hourly wages). For manual corrections, we consider income variables and working hours reported in previous (or following) panel waves, as well as job and education related variables. Only if a problem in the income is obvious, manual edits are applied. A manual correction either means to replace the income by the correct value if the correct value is known or to set the income to missing (-8, other error).

Criteria for checks	Measure
Yearly income has been set to -4 “no personal income”.	Monthly income is set to -4.
Manual corrections have been applied to the yearly incomes.	Manual checks
Monthly income is available but yearly income has been set to missing.	Cases are manually checked for plausibility. Usually, the yearly income was considered as missing or implausible, because it was not clear during how many months the income has been touched. For monthly income, this information is not relevant, so that in these cases monthly income even though yearly amounts are missing.
Monthly income is at least 1000 CHF higher than the yearly income divided by 12	Manual checks
Monthly income is higher than 30’000 CHF.	Manual checks on whether the reference period has been coded correctly by interviewers, to be sure that the amount given does not refer to yearly income.
Income amount represents only a rough estimate without further indication regarding the reference period.	Monthly amount is set to -8 (missing for other reasons), because no reference period has been provided with the income.
Hourly wages are lower than 10 CHF, respondent is over 20 years old.	Manual checks
Hourly wages are higher than 200 CHF, respondent is over 20 years old.	Manual checks
Strong variation in hourly wages over	Manual checks

time	

Table 3 Plausibility checks and measures taken for the construction of monthly salaries

3.5 Total personal income

The method to collect information on total personal income has changed in 2004:

- 1999-2003: 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. In a second step, the respondents were asked about income from various sources (see section 2 for the question wordings). Ideally, the sum of the various sources should correspond to the assessment of total global personal income.
- Since 2004: Only respondents with missing information on at least one income source are asked about total personal income. The total personal income is constructed by summing the different income components.

3.6 Plausibility checks of yearly personal income variables

After having computed the various 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 of the different income sources. In various cases, these two amounts do not 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 personal income (i$$ptotn i$$ptotg) is set to a missing value (-8). Amounts for single income sources were considered as valid if they were plausible. Also if the sum of income sources was higher than total income indicated, the sum of sources was taken as total personal income if single income sources are plausible (manual checks).

From W6 on, this double information on total personal income is not available any more. 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.[9] 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. Correction of typing mistakes

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

- A zero too much or too less
- Wrong reference period (yearly amount and monthly reference period or monthly amount and yearly reference period).

Checks for such mistakes are primarily effectuated directly at the survey agency (warning screen for large amounts). In the process of plausibility checking in the SHP, the programme tries to detect such mistakes automatically up to W5 (comparison of sum of individual sources and total personal income indicated). Some mistakes the program couldn't detect are corrected manually. From W6 on, typing and coding mistakes are corrected by manual controls in case very high incomes, large changes since the previous waves, or other inconsistencies between waves are observed. Values of previous and future waves are taken into account for manual correction. For manual correction, also relevant side information (change of job, calendar, household income, household structure) is considered.

B. Omission of an income source in the total income declared

Two types of omissions are encountered quite frequently:

- Total income declared equals professional income or old age pension. However, when asked about income sources specifically, other income sources are also declared.

[9] 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.

- 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.

C. Working income missing

Not all individuals declare an income from employment or self-employment even though 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 (as they have been first been asked about total income). 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 during all the year, the professional income is considered to be equal to total income. From W6 on, this problem cannot occur any more.

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 even though an individual reported to have no income, they declare some income amounts when asked about specific income sources. 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) may be linked to the fact, that for some income sources gross amounts have been declared

and for other, net amounts have been declared. After having computed 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
- High hourly wave

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 less likely to occur as only income variables on specific sources are asked.

I. Old age pension for couple declared as individual old age pension

Married retired persons receive the first pillar old age pension (AHV/AVS) as a couple and not individually. Sometimes, the entire pension of the couple has been declared by an individual (or both), overestimating old age pension. Rents which exceed the maximum of AHV/AVS are checked for double reporting. However, it may be possible to have supplementary pension, if a couple has no other income sources.

J. Partners persons report the same income

Similar to old age pension (1st pillar), also rental or capital income might be reported double by partners (or other household members). In contrast to old age pensions, there is however no upper limit which helps to detect such double information. Therefore, cases with two or more persons within a household report a rental, capital, or other income are checked manually. Information on total household income (or total personal income if given) and income of other panel waves are taken account of. If two partners report similar rental income, the amount is usually divided by two (unless total household income suggests otherwise). If an individual names a much higher rental income than his or her partner, the amount given by his or her partner is deducted from the higher amount (again, unless other information indicates that the amounts indicated by both partners are correct). For non-partnered household members, rental and capital income is usually not corrected. Each case is assessed manually.

4 Household income

4.1 Construction of gross and net household income (i$$htyn i$$htyg)

There are usually two different sources for household income: (1) from adding individual income of household members (collected in personal questionnaires) and (2) directly from the household questionnaire (variable h$$i58 h$$i59). For the addition of individual income, income from other household members is not taken into account from W4 on.[10] Depending on the household, household income variables (i$$htyn, i$$htyg) either refer thus to information from the personal, or from the household questionnaire. Generally, information from the personal interview is considered to be more reliable than the estimation by the reference person. The following rules apply for the construction of household income:

- Single adult households: If only one person of 14 years of age or older is living in the household, no question about total household income is asked and only information from the personal interview is available. For all other households.

[10] 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.

- Total personal income from all household members (14 years or older) available: Household income refers to the sum of individual income
- Sum of personal income is higher than estimation from household questionnaire (or less than 15% lower): Household income refers to the sum of individual income.
- Item non-response in personal income: 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 available is higher than the reported total household income, household income is replaced by the sum of the income sources.

If household income refers to information from the household questionnaire, no adjustments to gross and net income are applied (as we do not know the income source of the household income). If the sum of individual income and household income indicated in the household questionnaire are inconsistent (Sum of individual incomes exceeds the total household income by more than 180%) manual checks are carried out. A relatively frequent case is that, at the individual level, someone declares the income of the main earner as his or her own income (typically, a professionally non-active wife responds her husband's income as her own income).

4.2 Equivalised household income

For gross and net household income (i$$htyg, i$$htyn), equivalised income taking account of the household size and age structure, equivalence income is provided according to the modified OECD scale (variables i$$eqog, i$$ieqon) and the SKOS (SCIAS) scale (variables i$$eqsg, i$$eqsn).

4.3 Simulated taxes

The variable i$$htax simulates direct taxes at the municipal, cantonal and federal level in relation to the household income (i$$htyg, i$$htyn). Taxes are calculated for tax units (individuals or married couples) and then aggregated to the household level. The procedure used to simulate taxes is described in SHP Working paper 4_09 "Tax simulation in the SHP".

4.4 Disposable household income

The variable I$$DISPY indicates yearly household disposable income, which refers to income available after compulsory deductions:

I$$DISPY = I$$HTYN – I$$HTAX - compulsory health insurance premiums - payments to other households.

It includes all income sources of all household members. This variable is not equivalised to take account of the household size. A variable for the modified OECD equivalence scale is included in the file with imputed variables (imputed_income_hh_long_shp and imputed_income_hh_wide_shp).

Health insurance premiums

Health insurance premiums are completely simulated at the basis of mean health care premiums (for minimum franchise) by canton and age category. Additionally subsidises of health care premiums have been taken into account at the basis of the share of the population (by canton) receiving subsidies and the mean subsidies. First, subsidised and non-subsidised household are distinguished according to equalised net income. Within the subsidised households, households are divided into 3 equally large groups again according to their equivalised income. The lowest group received the 125% of the mean subsidy, the second group the mean subsidy and the highest group 75% of the mean subsidy. The total 4 groups (high subsidy, mean subsidy, low subsidy, no subsidy) have been constructed by canton and year.[11]

Payments to other households

For disposable income, payments to other households are deducted. From a theoretical perspective, compulsory payments such as alimonies for children should be deducted for disposable households, as individuals cannot influence these costs. To measure payments to other households, we use the questions h$$i71: “Since (month, year), have you or a member of your current household paid money to persons who are not, or no longer, part of your household (child not living with you

[11] Exception is the canton of VD since 2014, where subsidies for health insurance are computed according the individual situation and cantonal legislation. The reason for the different treatment in the canton of VD is the additional sample SHP LIVES – Vaud that started in 2014.

any more, relative in care, former partner retired) ? “ Respondents are than ask about the amount, the reference period (year, month, unique payment) and the number of month that this payment has been made (variables h$$i71, h$$i72, h$$i73, h$$i75).

These payments are deducted even if it is unknown whether they are compulsory or freely agreed.[12] More concretely, the following steps were conducted

- Missing number of month of payment (very few cases, n=66 over 20 waves): these cases were assessed manually under consideration of other panel waves, household income and household composition. If the payments seem to be regular, payment over the entire period was assumed. If the payment seemed unique and indicated a rather high amount compared to household income, one month was assumed. In cases of doubt, 50% of the year was assumed.
- Payments have been checked for their plausibility manually if they exceeded 80% of the household income. If a measurement error was likely, we edited values manually if a more plausible value is in the data. Examples for such corrections are arise from comparisons of payments over different years (e.g. confusion between yearly or monthly amounts, a zero missing in the amount, or payments to others were confused with payments received by others).
- Missing payments have been imputed with individual-specific means. If this was not possible, values were imputed assuming payments amount to 4.8 % of household net income (median value of the sample).
- We restricted payments so that they do not exceed a minimal household income (equivalised income, threshold of the SCIAS at 25752). This means that payments to other can only reduce household income up to this level. The reasoning for this threshold is that payments imposed by justice system (alimonies) do not reduce income beyond that level. The social security system provides a minimum income around that threshold. It is possible that

[12] The question wording is: “Since (month, year) have you or a member of your current household paid money to persons who are not, or no longer, part of your household (child not living with you any more, relative in care, former partner retired) ?”. In case of a positive answer, amount, reference period (per month, per year, unique payment) and number of month is collected.

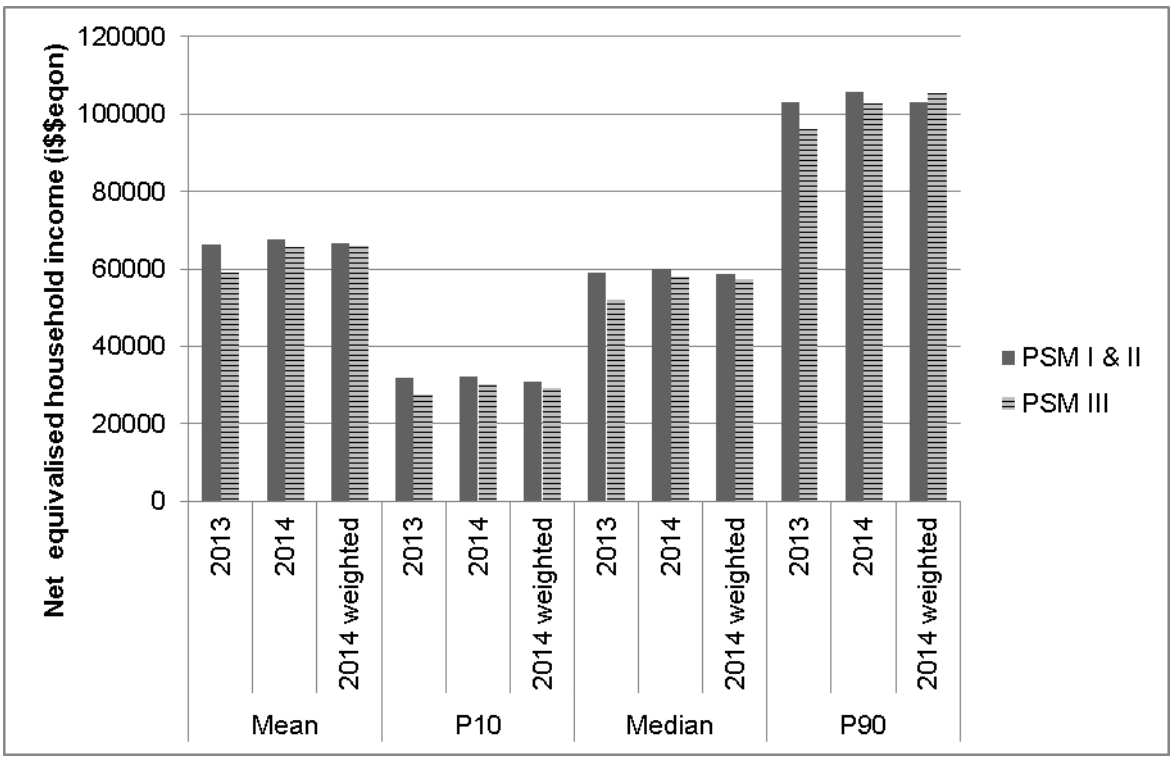
payments are higher than, but in this case the payments to others should be considered as a wealth transfer rather than a (negative) income.

5 SHP samples (SHP I – SHP IV)

5.1 Household income of SHP III, wave 1 (2013)

The SHP III has started with its first wave in 2013. Because the first wave collected uniquely biographical information at the individual level (see User Guide), there is no information on individual income. In 2013, information on income of the SHP III sample therefore relies only on the household questionnaire. The household income variables of the SHP III sample in 2013 (i$$htyn, i$$htyg, i$$eqon, i$$eqog, i$$eqsn, i$$eqsg) refer to the estimation by the reference person. If monthly income has been indicated, this amount has been simply multiplied by 12. Because this information cannot be validated or improved by using individual-level information, the household income variables of SHP III in 2013 cannot be compared directly with household income from SHP I and SHP II and with income from other years. The household income in SHP III in 2013 is underestimated and is therefore lower than the income of the SHP I & II. In 2014, the difference between the SHP III sample to the other households has decreased, although income levels of SHP III households are still slightly lower in 2014 as can be seen in Figure 1. Both attrition and age (SHP III households are slightly younger) contribute to lower household income of SHP III households. Weights (w14css in Figure 1) reduce the differences between samples. If samples are combined, the inclusion of the SHP III sample does hardly influence time trends.

Figure 1: Net equivalised household income in 2013 and 2014 by sample (analysis at individual level)



5.2 SHP IV

The SHP IV has been added in 2020 (wave 1). In contrast to older samples (SHP I to III), a significant proportion of interviews were carried out by Web. As Web-interviews are not interviewer based, measurement errors are more frequent than in telephone interviews. Notably, respondents do not report earnings although they say that they are (constantly) employed. In the quality check of the reported data, employment income is set to missing (rather than 0) if individuals seem to be employed (manual edits).

Another specificity of the SHP IV is a larger average household size than in older samples. This results in an increase in household income over time in 2020, but stable income evolution for individual income and equivalised household income.

6 Wealth

The SHP has collected information on household's net wealth in 2012, 2016, 2020 and 2023. There is are separate questions for house owner (owner-occupiers according to variable h$$h29), and questions on overall wealth (other wealth for owner occupiers). The annual user files include the original (untransformed) variables (see Table 4, Table 5). Since 2020, more detailed information on housing wealth is available, as market value of the property and mortgage have been collected with separate questions. Information on wealth has also been collected in 2009/2010 (SHP II in 2009, SHPI in 2010), but question wordings cannot be compared well between years.

2009, 2010	2012, 2016	2020, 2023
h$$i110: Net value, estimation "About how much money would be left if the home or apartment you live in was sold, and any debts on it, such as a mortgage or personal loan, would have been paid off?"	h$$i110a: Net value, estimation h$$i110b: net value, categories "How much money would you get if you sold the house or flat you are living in, after the deduction of the amount needed to reimburse the mortgage and other loans?"	h$$i110c: market value: estimation "How much money would you get if you sold the house or flat you are living in?" h$$i110d: mortgages: estimation "How much is the mortgage or other loan on your home?"

Table 4 : Overview of questions for housing wealth of owner-occupiers (original)

2009, 2010	2012, 2016, 2020, 2023 owners (h$$h29)	2012, 2016, 2020, 2023 owners (not owners)
h$$i111: Other wealth, estimation "About how much money would be left if you	h$$i111a: estimation h$$i111b: categories "In addition to the real estate	h$$i111c: estimation h$$i111d: categories "How much money is the

converted to cash all savings, stocks, or bonds you own, and then paid off any personal debts you have (not including any home loan)?"	assets already mentioned, what is the value of other assets owned by your household, such as other real estate assets, savings, stocks and bonds, after the deduction of potential debt?"	value of your household assets, such as real estate, savings, stocks and bonds, after deducting any debts?"

Table 5 : Overview of questions for other wealth (original)

For the years since 2012, two constructed variables housing wealth (weahlth$$) and other wealth (wealtho$$) that include imputed values in case of item non-response are provided to users in a specific file in wide format (imputed_income_wealth -> imputed wealth_hh_2012_2023). able

Imputation is conducted using the Stata algorithm for multiple imputation "mi impute chained". For file distributed to users, only the first imputed variable is retained. The wealth variable is highly skewed and choices made in the imputation process have important consequences for the imputation values. Therefore, we briefly document the steps made for the imputation process.

1. Compute the variables wealth$$ (housing wealth) and wealtho$$ (other wealth) for each year from original variables corrected. In the years 2012 and 2016 net housing wealth has been asked directly. In 2020, market value of the house and mortgages are collected separately (these variables are included in the distributed file). The plausibility of cases when mortgages exceed the market values, or market values above 2 millions are assessed manually and corrected if possible (using information of past waves, housing characteristics such as housing cost) or set to missing.
2. Missing values for wealth variables (wealthh and wealtho) were imputed cross-sectionally with multiple imputation in several steps (mi impute in Stata, chained imputation). For housing wealth, both linear values and logarithm are imputed, for other wealth the logarithm of other wealth. For housing values, the linear imputation is retained (as it yields better model fit and predictive accuracy than the logarithm). For other wealth, the predicted wealth were transformed back for the variable distributed

to users.the [13] For this imputation, predictive mean matching (pmm) is used. These allows to assess the quality of the imputations in the previous step and select the best model (as single imputation) among the multiple imputation results.

3. For some households with missing wealth, respondents indicated wealth brackets. If the imputation fell outside of the provided wealth bracket, the values are re-imputed using interval regression.

4. Steps 2 and 3 are performed several times for each wave (2012, 2016, 2020, 2023), but adding (imputed) wealth variables from other years are included as predictors to take account of between wave correlations in household wave (longitudinal information). With this procedure, the longitudinal relation between the waves should be considered to allow for longitudinal analysis.

   Specifically, the following procedure was followed: re-impute wealth in 2012 using the cross-sectional imputation of 2016 and 2020, re-impute wealth in 2016 using updated imputations from 2012 and cross-sectional imputations for 2020, re-impute wealth in 2020 using updated imputations from 2016 and cross-sectional imputations for 2023, re-impute wealth in 2023 using updated imputations from 2016 and 2020, re-impute wealth in 2012 using updated imputations from 2016 and 2020, re-impute wealth in 2016 using updated imputations from 2012 and 2020, re-impute wealth in 2020 using updated imputations from 2016 and 2023, re-impute wealth in 2023 using updated imputations from 2016 and 2020.

The following covariates are included in the predictive mean matching imputation model: educational level of main earner and partner, gender of main earner, age of main earner (groups), linguistic region, nationality (swiss, mixed, foreigner), migration background, participation in the survey (number of years with unit-non response), household type (single, couple with children, couple without children, etc), number of children in household, socio-economic status of parents (high vs others), financial difficulties in childhood, number of rooms in accommodation, receptions of windfall income in last 5 years, work status of main earner (no paid work, small part time, high part-time, full time), average number of paid

[13] Linear wealth variables are equally imputed in the chained imputation model and therefore used as predictor of log wealth. This approach has revealed to avoid a implausibly high number of outliers among the imputed wealth variables.

working hours in household, self-employed, going regularly to restaurant, saving for third pillar, household earns more that it spends, permanent disposable household income, canton with high average wealth. For housing wealth of owner-occupiers, additional variables are accounted for in the imputation model, namely badly heated accomodation, accommodation too large, household can afford holidays, care for other household members, health impediments, number of siblings, imputed rent.