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Longitudinal poverty measures

Dynamics of poverty in Switzerland: current and future analyses by the Federal Statistical Office

Note by the Swiss Federal Statistical Office (FSO)*

Summary

While cross-sectional indicators are important for calculating poverty rates and observing trends over time, they can only provide a part of the picture and should be completed by longitudinal analyses. In this paper, we first describe the current longitudinal poverty indicators published by the Swiss Federal Statistical Office (FSO) and then present new exploratory analyses focusing on poverty transitions. We show that poverty entry and exit rates are linked to changes in labour market status or household composition, but also to rather stable characteristics such as age class, education, nationality and health status. However, due to the small sample size and the rather short panel duration, possibilities for descriptive analyses of the longitudinal SILC data remain quite limited. While it would be important to increase the number of observations, we will also have to consider methodological approaches less sensitive to sample size.

* Prepared by Martina Guggisberg, Stephan Häni, Stéphane Fleury.

1 Introduction - Why study poverty dynamics?

The Swiss Federal Statistical Office (FSO) has been providing information on poverty in Switzerland for almost twenty years. Since 2007, the Swiss poverty statistics are based on the Statistics on Income and Living Conditions (SILC). Poverty indicators include the at-risk-of-poverty rate and material deprivation rate as defined by the statistical office of the European Union (Eurostat). Additionally, the FSO calculates a national poverty rate based on a poverty line that is deduced from national legislation defining the access to social aid in Switzerland. All poverty indicators are published on a yearly basis based on the cross-sectional component of SILC data. Accordingly, they provide information on the number and composition of the poor population per year as well as the evolution of the poverty rate in Switzerland over time.

These cross-sectional measures have an important limitation: as they only provide snap shots of the situation at certain points in time, they cannot account for individual poverty dynamics, e.g. if the same few individuals stay poor all the time (or are recurrently poor), or if poverty affects larger parts of the population for only a short period at a time. While short periods of low income may still be overcome without serious consequences, e.g. through a temporal limitation of consumption or using up assets, in the long-term, such possibilities are restricted. In the first option, where poverty persistently or recurrently concerns a rather small part of the population, the poor face an even greater risk of social exclusion and marginalisation, and poverty will be more difficult to overcome for the individual. In the second option, poverty is transient, but short poverty spells[1] can occur to many people during the life course. The two options thus lead to quite different policy implications for combating poverty effectively. However, they can only be distinguished with longitudinal data that provides information on the same individuals for several years. Furthermore, it seems important to know what events or characteristics are associated with higher poverty entry rates and/or longer duration of poverty episodes.

The analysis of poverty dynamics should thus provide answers to the following questions:

1) Is poverty concentrated on few individuals that remain poor for a long time and/or are recurrently poor, or are larger parts of the population concerned with rather short transient poverty spells?
2) Are there characteristics or events that are associated with a higher risk of entering poverty?
3) Are there characteristics or events that are associated with higher chances of exiting poverty?

In SILC, individuals are interviewed over a period of four consecutive years, which makes it possible to calculate a range of longitudinal poverty indicators. Chapter 2 provides a brief description of the SILC data. The FSO's current longitudinal poverty indicators are described in chapter 3, while chapter 4 provides additional indicators and exploratory analyses that have not yet been published. Chapter 5 concludes.

2 SILC longitudinal data

All analyses in this paper are based on the Statistics on Income and Living Conditions (SILC). SILC was introduced in Switzerland in 2007 and has been providing annual data on poverty, social exclusion and living conditions that is comparable on a European level. The survey is designed as a rotating panel: the same participants are interviewed over four consecutive years, and every year one quarter of the sample is replaced. According to European Commission (2017), this design was chosen to provide longitudinal information while maintaining cross-sectional representativity. Research can

[1] Following Bane & Ellwood (1986), "a poverty spell is defined as a continuous period during which income falls below the poverty line."

be based on cross-sectional data or focus on trajectories of individuals[2] over the years using the longitudinal dataset. Longitudinal SILC data for Switzerland has first been released in 2016 and is presently available for the years 2011-2014, 2012-2015, 2013-2016 and 2014-2017.

Figure 1 shows the structure of cross-sectional and longitudinal SILC datasets. The bold black frame depicts the cross-sectional dataset 2017, which consists of roughly equal proportions of four "waves" (samples) first selected in the years 2014, 2015, 2016 and 2017.[3] This corresponds to a total sample size of about 8,500 households with 18,000 individuals. The blue markings show the longitudinal dataset 2017, which consists of individuals first sampled in the years 2014, 2015 and 2016 that are still present in 2017.

Figure 1: Structure of cross-sectional and longitudinal SILC datasets

	2014	2015	2016	2017	2018	2019
W1 2014	W1	W2	W3	W4		
W1 2015		W1	W2	W3	W4	
W1 2016			W1	W2	W3	W4
W1 2017				W1	W2	W3

Notes: W1 = first wave, W2 = second wave, W3 = third wave, W4 = fourth wave

Source: FSO 2019

While sample size can be an issue for cross-sectional analyses with CH-SILC (e.g. for small population subgroups or regional characteristics going beyond NUTS-2 level), this is even more the case for longitudinal analyses. Depending on the transition to be analysed, different parts of the longitudinal sample are used. The longer the transition, the lower the sample size. For a transition between t-1 and t, individuals must be present in both years, which means that the sample consists of three quarters of the cross-sectional sample (grey frame in Figure 1). For analysing transitions from t-2 to t, the sample size is about half of the cross-sectional sample (dotted frame). If all four years are of interest, only one quarter of the cross-sectional sample remains.

Like all panel surveys, CH-SILC suffers from attrition, which further reduces the longitudinal subsamples. Possible reasons for attrition include a decrease in the net sample size (due to death, permanent departure abroad or admission to an institution), refusal to participate or contact data that is no longer valid (FSO 2019). In the end, about 12,000 individuals are present in the last 2 years, 7,400 individuals are present in the years t-2 and t, and roughly 3,000 individuals are present in all four years of the survey (see Table 1). This means that only about two thirds of the 4500 respondents in the first wave 2014 remained in the sample over all four years.

[2] As households are not stable over time, the unit of analysis for longitudinal data is always the individual.

[3] More precisely, the samples are of equal size in the first wave, but the number of observations declines over time due to panel attrition. This imbalance is adjusted by the use of weights.

Table 1: Longitudinal weights available in CH-SILC

	Individuals must be present	Possible missings	Representative of population	Unweighted sample size
RB062	t-1, t	t-2, t-3	t-1	12 064
RB063	t-2, t	t-1, t-3	t-2	7 400
RB064	t-3, t	t-2, t-1	t-3	3 175
RB064e	t-3, t	-	t-3	2 957

Sources: FSO 2019, CH-SILC 2014-2017 (longitudinal data)

Due to the survey design, longitudinal analyses based on SILC are by definition limited to a time span of four years. Interviews are conducted on a yearly basis, which means that there are four possible observation points with a relatively long time span in between (one year). Because of the rather short panel duration, poverty spells are often left or right censored. Left censored poverty spells occur when individuals are already poor at the first observation point, and right censored poverty spells refer to individuals that are poor when last interviewed. Since there is no information on what happens before and after the four survey years, in both cases, the actual duration of the poverty spell cannot be determined. In the literature, censored poverty spells are sometimes excluded from longitudinal analysis. Some authors (e.g., Iceland 1997), however, argue that this could lead to a selection bias as it systematically excludes long-term poor individuals from the data. Since there are only four observation points available in SILC, censored spells are not excluded from the analyses shown in this paper.

Following EU-SILC regulations (European Commission 2017), the FSO provides weights for transitions between previous years (t-1, t-2 and t-3) and the year of arrival (t) as well as for transitions over all four years. The weights account for non-response and panel attrition (FSO 2019). Weighted results are always representative of the starting population. This means that, e.g., results weighted with RB062 are representative of the population size and composition in the year t-1 (see Table 1). Since there are currently no weights available for transitions from t-3 to t-2 or from t-2 to t-1, it is not possible to extend the sample size of transitions between two consecutive years by using several data waves at once or to perform spell data analyses as suggested by Bane & Ellwood (1986) or Henke & Till (2014).

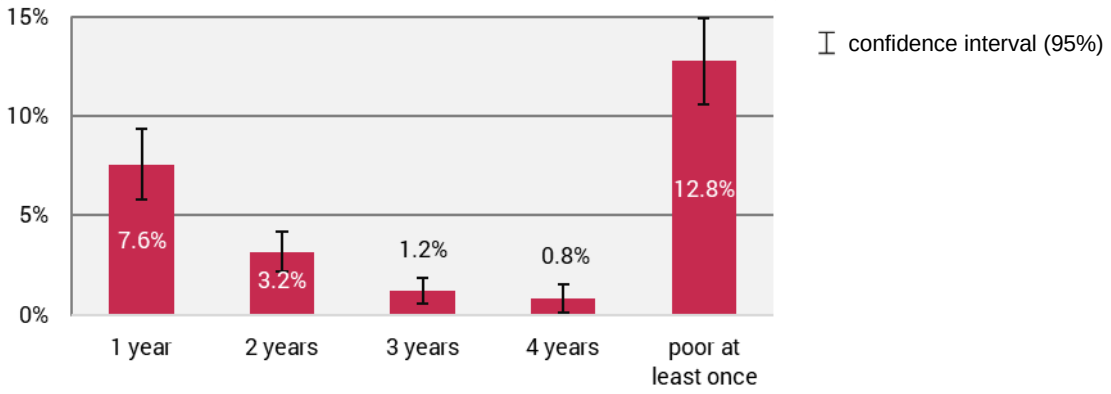
3 Current longitudinal analyses on poverty in Switzerland

Since the longitudinal data of CH-SILC was first released in 2016, the FSO's experience with longitudinal poverty measurement is still quite limited. So far, only one indicator has been published: the share of the population affected by poverty over a four-year period. For this indicator, the years each individual spends in poverty are counted, independently of when the poverty spell occurs. This means that persistent, recurrent and transient poverty spells are all taken into account in this indicator. The poverty status is calculated separately for each year and assigned to each individual based on cross-sectional data.

As usual in Switzerland, an absolute poverty line is used for national results and a relative poverty line for European comparisons. The poverty lines for longitudinal analyses are identical to those used for cross-sectional data: The national poverty line is set at the social minimum subsistence level that serves as the basis for measuring public social assistance benefits in Switzerland. It consists of a fixed amount for living expenses (food, hygiene, and mobility etc.), the individual housing costs as surveyed in SILC and CHF 100 per person aged 16 and over in the household for further expenditure such as insurance. The relative poverty line is set at 60% of the median equivalised disposable income of all individuals in the cross-sectional sample of the respective year.

While Switzerland's annual poverty rate was between 6.9% and 8.2% in 2014 to 2017, 12.8% of the population were considered to be poor at least once in the same period. This means that poverty affects a larger part of the population than is shown by the annual figures. However, it only lasts for a short period in most cases (see Figure 2): Between 2014 and 2017, 7.6% of the population were poor in exactly one of the four years of observation, but only 0.8% were affected in all four years. This finding is consistent with many other studies on poverty dynamics (e.g. Vaalavuo 2015). Due to the limited number of observations (less than 3,000 individuals), results for subgroups are not provided.

Figure 2: Persons affected by poverty over a four-year period, by number of years, in % of the population



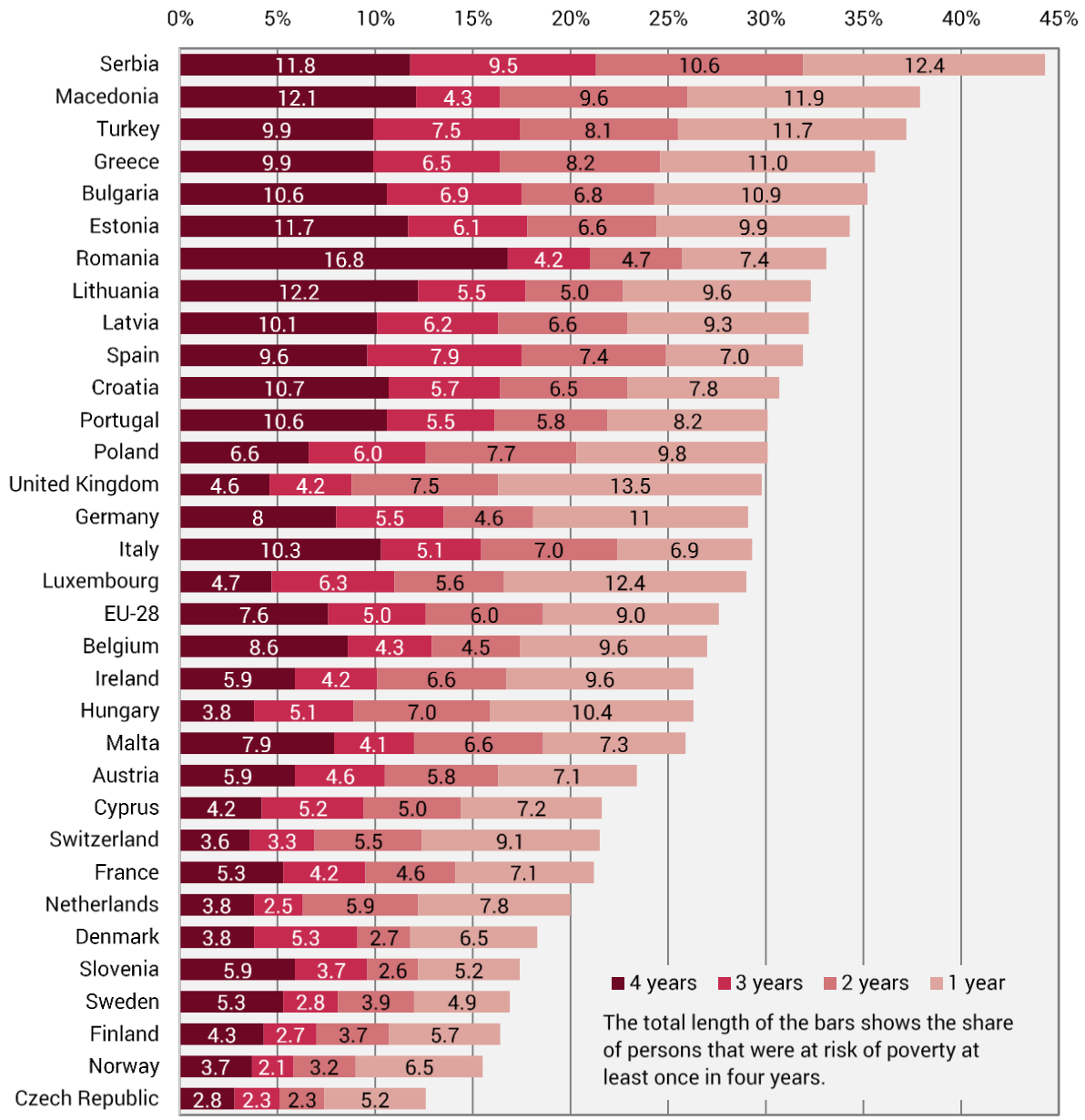
Note: Only individuals that are present in all four years of the survey are considered (N=2,957). Results refer to the national poverty rate, which is based on the social minimum subsistence level.

Source: CH-SILC 2014-2017 (longitudinal data, version from 3.6.2019)

This analysis could be further refined by showing whether the years spent in poverty are composed of one single poverty spell or several spells that are interrupted by time out of poverty (recurrent poverty). Additional calculations show that out of the 3.2% in poverty for two of the four years, 40% experienced two poverty spells of one year at a time, whereas 60% were poor in two consecutive years. For individuals who spent three years in poverty, only 21% were recurrently poor and 79% were poor in three years in a row. In total, 1.5% of the Swiss population were classified as recurrently poor in the four years considered. This percentage might of course be higher if a longer time span could be observed.

Eurostat produces the same indicator based on the relative poverty concept. Results for Switzerland can thus be compared on a European level (see Figure 3). Between 2014 and 2017, 21.5% of the Swiss resident population were classified as at risk of poverty at least once. The European average was 27.6%. Switzerland is among the countries with the lowest proportion of people at risk in the long-term. 3.6% of the population were at risk of poverty in all four years (European average: 7.6%). It should be noted that due to the high income level, Switzerland's at-risk-of-poverty threshold is among the highest in Europe.

Figure 3: Persons at risk of poverty over a four-year period in Europe, by number of years, in % of the population



Note: Only individuals that are present in all four years of the survey are considered. Results refer to the relative poverty rate at 60% of median equivalised disposable income as defined by Eurostat.

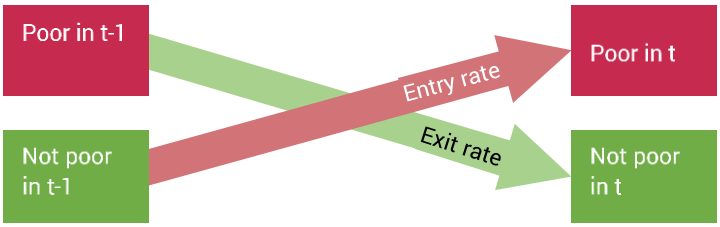
Source: EU-SILC 2014-2017 (longitudinal data as of 5.6.2019, dataset ilc_li51)

The current indicator is simple to understand and straightforward to calculate. However, as already pointed out by Bane & Ellwood (1986), it has important possible shortcomings: since there is no information on the poverty status of the individuals before and after they are in the survey, years spent in poverty are possibly underestimated. The rather short panel duration of four years represents only a small glimpse in an individual's life span. Long poverty spells are especially often left and/or right censored, which may lead to an underestimation of the duration of the poverty spell.

4 Future possibilities for longitudinal analyses on poverty in Switzerland

Another major limitation of our current longitudinal indicator is that it only comprises individuals that have been present in all four data waves. As mentioned above, this results in a small sample size preventing further breakdowns by subgroups as these would not be sufficiently stabile and reliable. In this section, we will provide additional results based on a larger sample of around 12,000 individuals that can be used if transitions from t-1 to t are analysed. We calculate entry rates into poverty as the proportion of non-poor entering poverty in a given year, and exit rates as the proportion of those in poverty exiting poverty (see Figure 4). The Swiss FSO has not yet published such results.

Figure 4: Schematic depiction of poverty entry and exit rates



Exit rate: percentage of poor t-1 that are no longer poor in t

Entry rate: percentage of non-poor t-1 that become poor in t

Source: own diagram

Thanks to the larger sample size, poverty entry and exit rates can be broken down by population subgroups and in relation to individual or household events. We consider several events based on theoretical considerations and empirical evidence from other longitudinal poverty studies (e.g. Can 2017, Vaalavuo 2015, Andriopoulou & Tsakloglou 2011, Fouarge & Layte 2005).[4] Labour market events and changes in household composition seem most important. Furthermore, previous experience of poverty and/or unemployment, as well as rather stable sociodemographic characteristics such as age, education level, nationality and chronic health issues might also affect an individual's probability to become (or stay) poor. While these events and characteristics would be useful for explaining the duration of poverty in an analytical model, we focus for the moment on descriptive analyses as these can be more easily communicated to the broad public. We therefore use them as breakdown characteristics for our entry and exit rates.

4.1 Changes in labour market status or household composition (events)

Following the literature mentioned above, we expect individuals to show a higher entry rate into poverty when they become less active on the labour market (job loss, pension, other inactivity). As the poverty status is defined on household level, a reduction of the work intensity[5] of the household is also expected to correlate with a higher entry rate into poverty. Changes in household composition like separation or divorce (couple household to single household), especially for households with children, or the birth of a child might also have a negative impact. Vice versa, positive effects are expected when labour market activities of the individual or the household are intensified or when individuals move in with someone else (from single to couple household).

[4] See Henke & Till (2014) for a practical guide on how to construct such events in SILC.

[5] The work intensity is calculated as the ratio of months worked by all household members of working age (18-59, excluding students) in relation to their total potential during the income reference period. Work intensity is therefore naturally correlated with the individual activity status, but provides additional information on the activity status of all other household members of working age while excluding pensioners.

Furthermore, we expect individuals with previous experience of poverty to be more prone to (re)entering poverty and individuals without previous poverty episodes to stay out of poverty more often. Many studies have shown that the probability of exiting poverty diminishes the longer a poverty spell lasts (e.g. Andriopoulou & Tsakloglou 2011, Fouarge & Layte 2005, Bane & Ellwood 1986). Can (2017) recently came to the same conclusion for Switzerland, based on a survival analysis with data from the Swiss Household Panel (SHP).

For individuals with an income close to the poverty line, a small increase or decrease of income can lead to a change of poverty status, even if their living conditions remain largely the same. Furthermore, the relative poverty line varies with the median income level, which means that even individuals with a stable income could change their poverty status from one year to another. It is therefore interesting to check whether changes in poverty status are related to significant changes in income. We assume that a person is experiencing a significant change in income if his or her disposable equivalised income increases or decreases by 25% or more (Vaalavuo 2015).

While the effect of an event on an individual's poverty status could be delayed (e.g. due to unemployment benefits), we nevertheless focus on changes between t-1 and t, as the sample size is the largest for this transition. To consider lagged event variables, more data waves would be necessary, which would again markedly reduce the sample size. Even so, many events did not happen frequently enough to be analysed: changes in activity status and in household composition were in general quite rare and concerned less than 10% of the population (see Table 2).[6]

[6] Publication criteria for CH-SILC request a subsample size of at least 100 individuals. This leads to sufficient stability and reasonably small confidence intervals in most cases.

Table 2: Frequency of selected events between 2016 and 2017

	Number of individuals in sample	Number of individuals in population	Relative frequency
Total population present in 2016 and 2017	12 064	8 066 221	100%
Labour market transitions			
From active to inactive	388	258 985	4.5%
unemployed	58	46 466	0.8%
Other inactive	185	120 582	2.1%
pensioner	140	88 212	1.5%
From inactive to active	361	249 517	4.3%
before: unemployed	55	45 630	0.8%
before: other inactive	252	171 675	2.9%
Fall of work intensity under 20% (very low work intensity)	253	182 176	2.7%
Rise of work intensity from below 20% to 20% or more	151	102 530	1.5%
Changes in household composition			
Single to couple (no children)	72	57 064	0.7%
Couple to single (no children)	68	47 845	0.6%
Couple with children to any other household type	251	179 495	2.2%
Household without children to household with children	95	82 259	1.0%
Income changes			
Decline in equivalised disposable income > 25%	1 688	1 136 821	14.1%
Increase in equivalised disposable income > 25%	1 965	1 308 426	16.2%

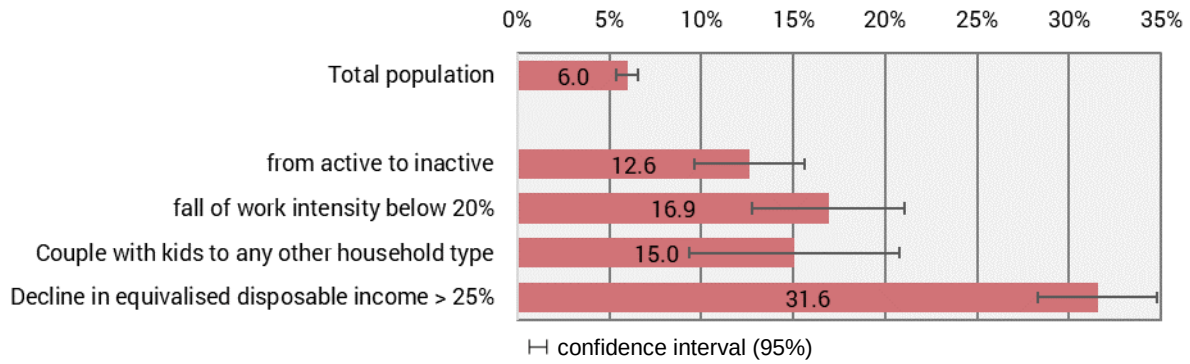
Note: Results in last two columns are weighted with RB062. The activity status refers to the most frequent activity in the income reference period (calendar year before the survey). The work intensity is calculated as the ratio of months worked by all household members of working age (18-59, excluding students) in relation to their total potential during the income reference period. The household composition refers to the situation at the moment of the interview.

Source: CH-SILC 2014-2017 (longitudinal data, version from 3.6.2019)

We conduct a simple SAS surveymeans procedure to find out how these events relate to entry and exit rates. Results refer to the relative at-risk-of-poverty rate at 60% of median equivalised disposable income as defined by Eurostat. For the sake of readability, we rather use the term “poor” instead of “at risk of poverty” in this chapter.

In total, 6.0% of the Swiss population that was not poor in 2016 became so in 2017. We call this proportion entry rate. It differs quite substantially between population subgroups and according to some of the events defined above (see Figure 5). As expected, entry rates were especially high for individuals who lost or gave up their job (new pensioners, unemployed or other inactive) in 2017 (12.6%) and individuals in households where the work intensity fell below 20% (16.9%). Entry rates were also high for individuals who used to live in couple households with children that split up (15.0%). Lastly, entry into poverty was often associated with a substantial drop in income: Individuals experiencing a reduction of disposable equivalised income of more than 25% showed the highest entry rate (31.6%).

Figure 5: Entry rates into poverty by selected events between 2016 and 2017



Note: only individuals present in the last two data waves and not poor in 2016 are considered (N=10,684). Events refer to changes in individual characteristics between 2016 and 2017. Results refer to the relative poverty rate at 60% of median equivalised disposable income as defined by Eurostat.

Source: CH-SILC 2014-2017 (longitudinal data, version from 3.6.2019)

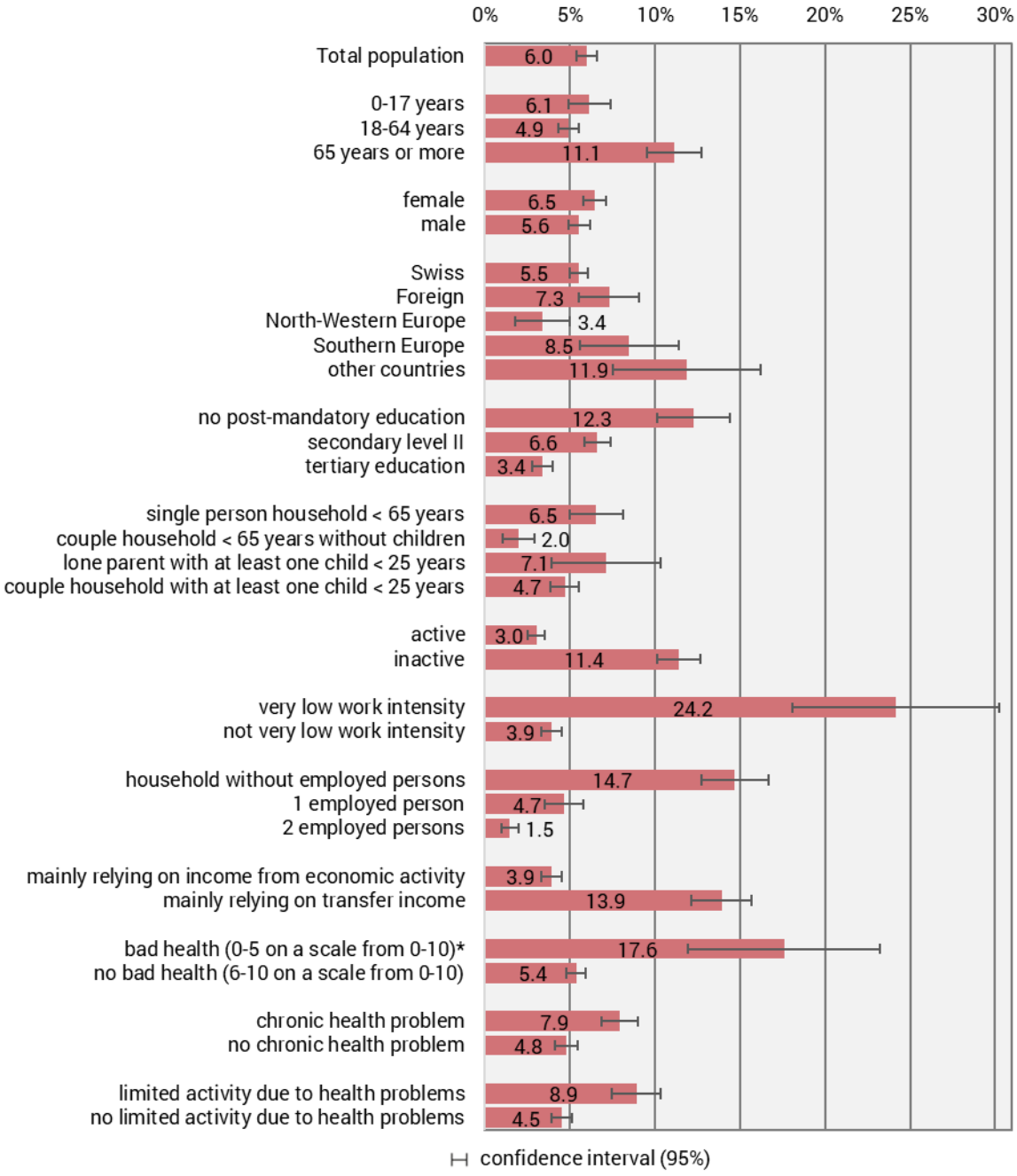
36.5% of all individuals that were poor in 2016 managed to exit poverty in 2017. This proportion is referred to as poverty exit rate. Since exit rates only refer to the relatively small poor population, they are expected to have much higher values than entry rates. They also differ by population groups and were highest for individuals that experienced a substantial rise of their equivalised disposable income of 25% or more (73.0%). Other than that, none of the defined events occurred frequently enough among the poor population in the sample to be analysed.

4.2 Sociodemographic characteristics

Sociodemographic characteristics such as age, gender, education level, nationality, household type or issues such as chronic health problems are also considered important factors for an increased risk of poverty. We therefore use them as additional breakdown characteristics for poverty entry and exit rates. The following analysis by subgroups was restricted to individuals that did not experience a change of status between 2016 and 2017 in the selected characteristics. Since these characteristics were rather stable in our sample (see Table 3 in the Appendix), this did not substantially reduce the sample size.

Figure 6 shows that older persons (65 or older) entered poverty significantly more often than the other age groups (11.1% vs. 6.1% of children and 4.9% of 18-64 year-olds). As old-age pensions are generally quite stable over time, changes in poverty status of the elderly might rather be due to changes in household composition (e.g. death of partner). Furthermore, as the median income (and therefore also the relative poverty threshold) has increased in Switzerland between 2016 and 2017, individuals with an income only slightly above the poverty line in 2016 might also have entered poverty in 2017 even when the income remained the same. Indeed, 21.9% of persons of retirement age who depended on state pensions (first pillar of the Swiss pension system) as their main income source entered poverty in 2017, but only 1% of pensioners who could mainly rely on occupational pensions (second pillar). While the state pension is supposed to cover basic needs in old age or the event of disability, the occupational pension should secure the accustomed standard of living. Individuals relying mainly on state pensions are therefore much more often concerned with an income close to the poverty threshold.

Figure 6: Entry rates into poverty between 2016 and 2017, by selected characteristics



** low sample size*

Note: only individuals present in the last two years of the survey and not poor in 2016 are considered. Subgroups comprise only individuals where the respective characteristics did not change between 2016 and 2017. Results refer to the relative poverty rate at 60% of median equivalised disposable income as defined by Eurostat.

Source: CH-SILC 2014-2017 (longitudinal data, version from 3.6.2019)

The poverty exit rate of the elderly was lower than the exit rate of 18-64 year-olds (29.4% vs. 43.8%, not shown in the figure). This means that once persons of retirement age enter poverty, they are more likely to remain poor than persons of working age. Over all, these findings are in line with the rather high cross-sectional poverty rate of the elderly in Switzerland. However, it must be noted that poverty is defined here as income poverty. Other analyses have shown that older persons in Switzerland can

often refer to assets to finance their standard of living, so that income poverty does not necessarily mean financial strain for this age group (Guggisberg & Häni 2018).

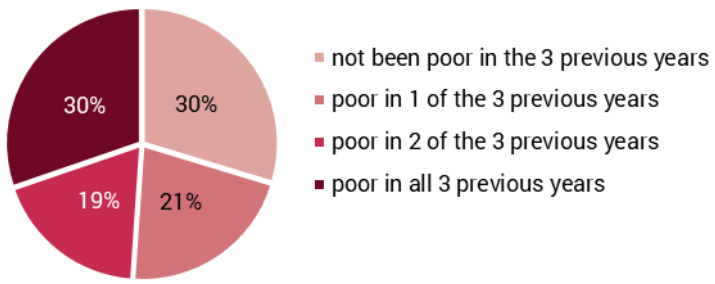
Individuals without post-mandatory education became poor more than twice as often (12.3%) as those with secondary or tertiary degrees (6.6% and 3.4%). Foreigners from countries outside Northwestern or Southern Europe also showed an above average entry rate (11.9%). Furthermore, economically inactive individuals (11.4%) as well as households where no one worked (14.7%) and/or with very low work intensity (24.2%) entered far more frequently into poverty than their counterparts. Accordingly, households that relied on transfer income were also more prone to becoming poor (entry rate of 13.9%) than households that were able to finance themselves with labour income (3.9%). As mentioned above, this is especially true for households depending mainly on old-age or disability pensions from the first pillar (state pension) of the Swiss pension system or on means-tested transfer income. Another important factor is the self-perceived individual health status. Individuals with bad health (17.6%) and chronic health problems (7.9%) entered significantly more often into poverty than those with better health. These results do not change significantly when only individuals of working age (18-64 years) are considered.

All the groups mentioned in the last paragraph do not only show relatively high entry rates into poverty, but also low exit rates and thus a larger proportion of individuals that were poor in both 2016 and 2017. This is again in line with the above average cross-sectional poverty rates of the respective population groups. One possible interpretation of this finding is that poverty in Switzerland concerns mainly economically inactive individuals and households, while individuals that are well integrated into the labour market mostly manage to stay out of poverty. Since changes in activity status are quite rare from one year to the next, this implies that a rather small part of the population is persistently or recurrently poor and thus especially at risk of social exclusion.

4.3 Past poverty experience

For a simple test of this hypothesis, we look at the past poverty status of those poor in 2017 (see Figure 7). In this analysis, we consider only individuals that have been present in all four data waves. Our results show that indeed most of the poor in 2017 had already been poor at least once in the three previous years of the survey: 21% had one year of prior poverty experience, 19% had already been poor in two years and 30% were poor in all four years of the survey.

Figure 7: Individuals at risk of poverty in 2017 by previous poverty experience



Note: only individuals that were present in all four years of the survey are considered (N=2,957). Results refer to the relative poverty rate at 60% of median equivalised disposable income as defined by Eurostat.

Source: CH-SILC 2014-2017 (longitudinal data, version from 3.6.2019)

It must be noted here that the proportion of poor in 2017 based on the 4-year longitudinal SILC sample is substantially lower than the cross-sectional poverty rate 2017. According to Vaalavuo (2015, p. 13),

this is the case for most European countries and especially those with rather low poverty rates. This could indicate that panel attrition is especially high for poor individuals and not fully accounted for by the weighting and should be kept in mind when cross-sectional and longitudinal measures are combined (e.g. part of poor population 2017 that has been persistently poor).[7] It should also be mentioned that we do not know whether individuals were poor in the years prior to the survey. Accordingly, larger parts of the population could have previous poverty experiences than shown here.

5 Conclusions

While cross-sectional indicators are important for calculating poverty rates and observing trends over time, they only provide one part of the picture. Effective measures for preventing or combating poverty require additional information on individual poverty trajectories. The longitudinal component of SILC could thus provide valuable insight into poverty dynamics.

The analyses on the duration of poverty already published by the FSO show that in the course of four years, poverty concerns a larger part of the population than is shown by the annual figures. While most individuals only stay poor for one year, around 1% of the population were affected in all four observation years and were thus at a particularly high risk of social exclusion. Since these analyses require information on all four data waves, the sample size is too small to provide information for population subgroups. However, information on characteristics and events associated with an increased probability to become poor (or exit poverty) would be useful for developing policy measures.

The additional analyses on poverty transitions consider all individuals present in the last two data waves and are thus based on a much larger sample. We calculated poverty entry and exit rates for various population subgroups and in relation to different events such as changes in labour market status or household composition. However, such events being very rare between one year and the next, sample size was again a major constraint, especially for poverty exit rates that are only calculated for individuals that are poor in t-1. For this reason, the focus of the analysis rested mainly on poverty entry rates.

As expected, entry into poverty was often linked to a substantial reduction of household income. Furthermore, poverty entry rates tended to be higher for individuals and households where economic activity decreased, but were even greater when work intensity was low in both observation points and when the household relied mainly on transfer income. Other rather stable factors associated with increased entry rates were age, low education, foreign nationality and health issues. Lastly, we found that about two thirds of the population at risk of poverty in 2017 had already been at risk in at least one of the three prior years.

We conclude that, due to the small sample size and the rather short panel duration, possibilities for descriptive analyses of the longitudinal SILC data remain quite limited even when only two years are taken into account. Eurostat plans to extend the panel duration to six years, which would allow to observe a longer time span, so that the measurement of recurrent poverty could be improved. At the same time, it would provide a significant improvement of sample size: the sample for a time span of four years would theoretically double, even if the overall cross-sectional sample size remained the same (see

[7] From 2021, additional auxiliary variables such as the poverty status or material deprivation status in the first wave will be used for modelling the longitudinal weights to address this problem. In the cross-sectional weights, such variables are already taken into account.

Table 4 in the appendix).[8] However, Switzerland will unfortunately not be able to move to a six-year panel in the near future. We must therefore consider other options.

The sample size could also be increased if additional weights were provided for transitions between t-3 to t-2 and t-2 to t-1, so that several data waves of one longitudinal dataset could be used at once. This would also enable the analysis of poverty spells, which would further enlarge the sample, since individuals can have more than one spell in the observation period. Even so, some events being very rare, it would be of great interest to pool data of different longitudinal datasets. Here again, respective weights would have to be developed. Furthermore, the descriptive analyses should be extended by analytical models that are less sensitive to sample size and more suitable to consider rare events and account for interactions between independent variables.

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[8] Attrition is not taken into account in these calculations, but according to the European Commission (2015), attrition patterns should not be affected by a panel extension from four to six years.

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Appendix

Table 3: Stability of individual sociodemographic characteristics between 2016 and 2017

	no change	change	total in 2017
Age group (0-17, 18-64 or 65+)	11 781	283	12 064
Nationality (Swiss, North-Western Europe, Southern Europe or other countries)	12 000	64	12 064
Education level of persons 18+ (mandatory education, secondary II or tertiary level)	9 504	314	9 818
Household type (single person < 65, single person ≥ 65, couple < 65, couple ≥ 65, single parent with child < 25, couple with child < 25)	11 193	871	12 064
Individual activity status (active or inactive)	7 706	1 117	8 823
Work intensity of household (<20% or 20% or higher)	9 528	444	9 972
Number of workers in household (0, 1, 2 or 3+)	9 084	2 980	12 064
Main source of household income (labour market income, transfers or income from assets)	11 492	572	12 064
Poor health (0-5: yes or 6-10: no)	8 251	512	8 763
Chronic health problem (yes or no)	7 197	1 883	9 080
Limited activity due to chronic health problem (yes or no)	7 043	2 050	9 093

Note: unweighted number of individuals in sample

Source: CH-SILC 2014-2017 (longitudinal data, version from 3.6.2019)

Table 4: Sample size with a panel duration of 4 and 6 years

a) Panel duration of 4 years

Transition	4 years	3 years	2 years	1 year	(= cross-sectional sample)
4 years	4500	4500	4500	4500	
3 years		4500	4500	4500	
2 years			4500	4500	
1 year				4500	
Total sample size	4 500	9 000	12 500	18 000	

b) Panel duration of 6 years

Transition	6 years	5 years	4 years	3 years	2 years	1 year
6 years	3 000	3 000	3 000	3 000	3 000	3 000
5 years		3 000	3 000	3 000	3 000	3 000
4 years			3 000	3 000	3 000	3 000
3 years				3 000	3 000	3 000
2 years					3 000	3 000
1 year						3 000
Total sample size	3 000	6 000	9 000	12 000	15 000	18 000

Notes: This mathematical example shows the theoretical sample size with a cross-sectional sample of 18 000 individuals, not taking into account attrition. Even though the size of each subsample is smaller in the 6-year rotational panel, transitions for four years double from 4 500 respondents to 9 000 respondents because three subsamples can be used instead of just one in the 4-year rotational panel.

Source: own table