Caught in the slough

Poverty persistence in Switzerland

Lukas Hobi, Bern University of Applied Sciences, June 4th, 2023

1. Introduction

Being poor can have negative social (Mood and Jonsson 2016) and employment (Biewen 2009) consequences. It can cause negative psychological health consequences and stigma, e.g. due to being dependent on social assistance (Ali et al. 2018), as well as negative physical health consequences. Poverty may translate into debt, if e.g. a drop in income or a hike in expenses makes it difficult to finance current expenses (Pressman and Scott 2009b; 2009a). Thus, while being poor is a consequence of negative economic, social or health conditions, it can further deteriorate circumstances to prolong or cause future poverty. The consequences of poverty may be more severe, the longer a poverty episode lasts. Likewise, chances of escaping poverty decrease the longer a person stays poor (Devicienti et al. 2014), and exits from poverty may not be durable.

A larger share of the population is affected by poverty if it is measured longitudinally rather than in the cross-section (Layte and Whelan 2003), since a larger share of the population experiences short poverty episodes (Jarvis and Jenkins 1997) which may not be captured if we look at one specific year. This also implies that social security systems such as unemployment insurance or social benefits support a larger share of the population over the years than can be observed in a cross-sectional perspective. Short, long,

1

or recurring poverty episodes also require different countermeasures (Finnie and Sweetman 2003). Whereas short poverty periods may be addressed with large-scale, less intensive measures to bridge financial needs, long or recurring poverty periods require more tailored and intensive measures (Mood 2015). Policies to address poverty should take effect early during a person's poverty episode and should also prevent falling back into poverty (Devicienti et al. 2014), which becomes less likely, the longer a person stays out of poverty.

In this article we use linked fiscal and administrative data for a large political district in Switzerland for the years 2012 to 2015 to study longitudinal poverty. We measure income poverty and asset-based poverty, which affects a sub-group of the income poor that lack financial reserves to cover expenses for the span of one year (or another defined time-period). We graphically explore poverty flows for the 2012 income poor cohort and find that asset-based poverty is the more dynamic state, with many exits to non-poverty over the observed four years, whereas exits from income poverty to non-poverty are less frequent. The dynamics are very different by age. Poor persons in working age and children generally lack financial reserves. However, more than half of the cases manage to escape poverty over the observed period. Poor pensioners on the other hand usually have financial reserves. However, only a fraction manages to escape poverty over the observed four years. We use dynamic linear panel data models to measure how labor market participation, the social benefit system and asset consumption influence poverty status and to estimate poverty persistence. An increase in the labor market income of the main or secondary earner in the household reduces the probability of being poor the most, while pensions and incomes from real estate are also important to reduce poverty for pensioners. We find that poverty is a persistent phenomenon, with the probability of being income poor in the current year increasing by 21.7 percentage points for the working age population and children (29.1 percentage points for pensioners) and the probability of being asset-based poor in the current year increasing by 19 percentage points for the working age population and children (30.5 percentage points for pensioners) if an individual has been income or asset-based poor in the previous year.

The remainder of this article is organized as follows: Section 2 reviews the literature on poverty dynamics and poverty persistence and gives details on the studied institutional context. Section 3 describes the data and methods used. Section 4 shows results on poverty flows. Section 5 presents results on labor market attachment, social benefit use, asset consumption and poverty persistence. Section 6 concludes.

2. Review of the literature

Risk groups and factors

Although poverty is a substantial phenomenon in many countries[1], it may go largely unnoticed, since it is not directly observable by individuals (c.f. Andriopoulou and Tsakloglou 2011a). Not all sociodemographic groups face an equal risk of long poverty spells. Risks of prolonged poverty trajectories are reported for women (Oxley et al. 2000; Oris et al. 2017), households headed by (single) women (Stevens 1994; Stevens, Ann Huff 1999; Devicienti 2011), children (Vaalavuo 2015; Leu et al. 1997; Andriopoulou and Tsakloglou 2011b; Devicienti 2011; Devicienti et al. 2014), households headed by young and elderly individuals (Andriopoulou and Tsakloglou 2011b; Devicienti et al. 2014) and for older persons (Jarvis and Jenkins 1997; Devicienti 2011), especially shortly before retirement (Bound et al. 1991) and with ongoing age (Smith et al. 2007; Salzgeber et al. 2010). Household type and civil state can be important predictors of prolonged poverty trajectories too (Finnie and Sweetman 2003; Budowski et al. 2002; Gutjahr and Heeb 2016), with couples with children, single parents, young persons, persons living alone (Fouarge and Layte 2005) and widows (Bound et al. 1991) reported as being at risk more frequently. A lack of education is often reported as an important risk of prolonged poverty trajectories too (Crandall and Weber 2004; Budowski et al., 2002; Gabriel et al. 2015; Oris

---

[1]The EU average at-risk-of-poverty rate was 16.9% in 2017 with values ranging from 9.1% to 25.7% for individual countries, c.f. Archive:Income poverty statistics - Statistics Explained (europa.eu), last visited on 04.06.2023.

et al. 2017; Salzgeber et al. 2010; Hümbelin and Fritschi 2018; Stevens, Ann Huff 1999; Andriopoulou and Tsakloglou 2011b; Layte and Whelan 2002; Devicienti 2011; Devicienti et al. 2014; Vaalavuo and Sirniö 2022).

Further important factors for poverty dynamics reported in the literature include: Changes in the household heads' income (Jenkins 2000), changes in secondary earners' income (Andriopoulou and Tsakloglou 2011b; Devicienti et al. 2014), changes in non-labor income (including benefits) and changes in household composition (Bane and Ellwood 1986). Similarly, short employment spells and part-time work are less effective ways to escape poverty and may instead lead to in-work poverty (Vaalavuo and Sirniö 2022).

The Swiss context

Despite its wealth and well-functioning labor market, poverty is a prevalent phenomenon in Switzerland[23]. The Swiss social welfare system consists of social insurances (old-age and survivor's insurance (OASI), occupational benefits, disability insurance, unemployment insurance, health and accident insurance, income compensation allowance in the event of service or maternity, family allowances) and means-tested social insurances (supplementary benefits and premium reductions) on the federal level to cover against social risks. These are complemented by further means-tested measures on the cantonal (e.g., maintenance advances) and communal level. By far the most important means-tested social insurance is social assistance, which is subsidiary to the other means-tested insurances, i.e., a claim to social assistance can be made only if needs cannot be covered through other means-tested social insurances. Financial reserves also need to be depleted below a certain threshold before a claim to social assistance can be made.

The OASI, disability insurance and supplementary benefits together are

---

[2]8.7% of the permanently resident population living in private households in Switzerland was income poor in 2021, c.f. Poverty | Federal Statistical Office (admin.ch), last visited on 04.06.2023.

[3]The at-risk-of-poverty rate for Switzerland was 15.5% in 2017, below the EU average of 16.9%, c.f. Archive:Income poverty statistics - Statistics Explained (europa.eu), last visited on 04.06.2023.

also called the 1st pillar and are compulsory. The occupational benefits are also called the 2nd pillar and are compulsory for employees. An important 3rd pillar is private provision which is not compulsory.

Research questions

Many studies focus on income poverty due to a lack of reliable data on financial assets. The role of financial reserves for poverty dynamics is therefore not well studied. This is a significant blind spot in the literature since financial reserves serve to bridge periods of insufficient income. And in the Swiss welfare system and many other countries wealth must be depleted below a certain threshold before a claim to social benefits can be made. In the absence of financial reserves, there is the risk of running into debt, if income is insufficient to cover expenses over a long enough period (Pressman and Scott 2009b; 2009a). Using the information in the fiscal data we calculate asset-based poverty (Brandolini et al. 2010) and study the role of financial reserves for poverty dynamics alongside income poverty. We formulate the following two research questions:

(1) Are income poverty and asset-based poverty transient or persistent phenomena? Is income or asset-based poverty more persistent, i.e., is it easier to escape from income poverty or asset-based poverty?
(2) How do the social benefit system, labor market attachment and asset consumption play together to protect against poverty? Which is most important to escape poverty?

3. Data and methods

Measuring longitudinal poverty using linked fiscal and administrative data

We measure poverty as a lack of financial resources. Although there is consensus in the literature that poverty should be measured as a

multidimensional concept (c.f. Alkire and Apablaza 2016), poverty defined as a lack of financial resources has the advantage of being measurable in a conceptionally clear manner as well as being a key-figure for social policy and in the welfare literature. Since Switzerland is one of the few countries that levy taxes on income and wealth, the interplay of income and wealth over time can be studied with Swiss fiscal data.

We use linked fiscal and administrative data collected as part of the research project "Inequality and poverty in Switzerland"[4] funded by the Swiss National Science Foundation. Fiscal data was linked to the population register and the social assistance register. The linked data allow to reliably assess a household's financial resources and financial poverty. A first indicator measures income poverty. It refers to the social subsistence level of Switzerland, which is the official absolute poverty line and, given that a household's financial reserves are sufficiently low, indicates the threshold that qualifies for social assistance. A household is poor if its expenses for the minimum needs (as set by the national standards, c.f. BKSE 2020; Schweizerische Konferenz für Sozialhilfe 2015), rent and health insurance premia outweigh its total income including social transfers from insurances or other benefits. A second indicator measures asset-based poverty (c.f. Brandolini et al. 2010; UN 2017). According to this indicator a household is poor if it is income poor and at the same time does not have enough financial reserves to cover expenses for the social subsistence level for a defined time-period, which we define as one year for our study. The asset-based poor are therefore always income poor. They are a subgroup of the income poor, characterized by a more severe form of poverty (lack of income and financial reserves). Although our unit of analysis is the individual, we assess poverty at the household level since household members generally share resources[5]. Details on data preparation can be found in Hümbelin et al. 2022.

---

[4]c.f. Inequality and poverty in Switzerland – Collaborative research project of the Institute of Sociology, University of Bern and the Department of Social Work, Bern University of Applied Sciences (unibe.ch), last visited on 04.06.2023.

[5]This corresponds to how income poverty is calculated in Swiss official statistics (c.f. FSO 2012).

In this article we apply the logic of asset-based poverty to the non-poor with sufficient financial reserves to cover expenses for the social subsistence level for one year to allow a closer look at poverty dynamics. This yields the groups: non-poor and non-poor with assets, where the latter are a subgroup of the non-poor characterized by a more consolidated form of financial security (sufficient income and financial reserves)[6]. Distinguishing these groups may seem less relevant, since our focus is on poverty persistence and neither of these groups are poor. But the distinction helps our graphical analysis, to confirm whether poor exit into non-poverty with or without assets. The two groups are also substantively different in that the non-poor with assets are better protected against becoming asset-based poor than the non-poor in general are, although they are not necessarily better protected against income poverty.

We use data for the years 2012 to 2015 for the canton of Bern[7], which is a large political district in Switzerland and accounts for roughly 12% of the Swiss population[8]. The canton of Bern is mainly German-speaking but includes French-speaking communes and has a mix of urban and rural municipalities. It is average in terms of the share of its population which is dependent on social assistance[9]. Our data can therefore be thought of as being broadly representative for Switzerland. Our merged sample over the four years contains 910'346 individuals. 125'765 individuals are dropped from the sample, because they cannot be observed in all four years, likely

---

[6]We thank participants at the 2022 RC28 conference in London for pointing out this important subgroup.

[7]To date it is not possible to obtain fiscal data for all Swiss Cantons because of legal and administrative reasons.

[8]The permanent resident population of the canton of Bern by the end of 2021 was 1'047'473 individuals, c.f Bevölkerungsstand und -struktur, last visited on 04.06.2023. The permanent resident population in Switzerland at the end of 2021 was 8'738'791 individuals, c.f. https://www.bfs.admin.ch/bfs/de/home/statistiken/bevoelkerung.html, last visited on 04.06.2023.

[9]With a social assistance rate of 9.9% the canton of Bern was slightly above the Swiss average of 9.5% in 2020, c.f. https://de.statista.com/statistik/daten/studie/942766/umfrage/sozialhilfequote-in-der-schweiz-nach-kantonen/, last visited on 04.06.2023.

because they moved away from the canton or because they were born or died within the time frame. Our main sample for the analysis contains 784'581 individuals as a result. In section 4 we study poverty flows with a focus on the 2012 income poor cohort. The sample used in that section contains only 73'231 individuals (i.e., 9.3% of the individuals in the main sample, which corresponds to the 2012 income poverty rate).

Fiscal data are less susceptible to issues of non-response, recall bias or panel attrition than survey data (c.f. Hümbelin and Farys 2016; Mood 2015), which makes them an interesting data source for longitudinal studies. To illustrate this, we compare our data to results on poverty dynamics in Swiss official statistics on the national level which are based on the "Statistics on Income and Living Conditions"[10] (SILC) in Table 2.1. Swiss official statistics find income poverty to be a short-term state for a large part of the concerned individuals[11]. Like the official statistics, we find that more persons are income poor in at least one of the four observed years, rather than in exactly one year as would be observed in a cross-sectional perspective. However, we find more persistence for income poverty in our data. Our shares are lower than the official statistics for being income poor in exactly one or two years, but they are higher for being income poor in exactly three or all four years, as well as being income poor in at least one year. Our share for being income poor in all four years (4.5%) even exceeds our shares for being income poor in exactly two (3.1%) or three years (2.2%), which we do not see for income poverty in official statistics or asset-based poverty in our data.

---

[10]c.f. https://www.bfs.admin.ch/bfs/en/home/statistics/economic-social-situation-population/surveys/silc.html, last visited on 04.06.2023.

[11]From 2017 to 2020, 16.3% of the Swiss population was income poor at least once, while 3.2% were income poor in 2 years and 1.9% were income poor in 4 years. During the same period, 27.2% of the Swiss population was at-risk-of-poverty at least once, whereas values for other European countries range from 15.4% to 39.3%. 4.5% of the Swiss population was at-risk-of-poverty in 4 years, whereas values for other European countries range from 2.5% to 13.8%, c.f. Dynamics of poverty | Federal Statistical Office (admin.ch), last visited on 04.06.2023.

Table 1: Income and asset-based poverty in 2012 – 2015, in % of the population.

	Income poor	Asset-based poor	Income poor, FSO
In at least one year	16.2	9.4	13.6
In exactly 1 year	6.5	4.7	7.7
In exactly 2 years	3.1	2.1	3.7
In exactly 3 years	2.2	1.3	1.1
In all 4 years	4.5	1.3	1.1

Source: WiSiER-data canton of Bern, 2012 - 2015, calculations inequalities and ‹Dynamik der Armut: Armutsindikatoren im Zeitraum von vier Jahren, nach Anzahl Jahren - 2014-2020 | Tabelle | Bundesamt für Statistik (admin.ch) . C.f. Dynamics of poverty | Federal Statistical Office (admin.ch) for the most recent years.

Analytical strategy

To answer our research questions, we explore flows from income or asset-based poverty out to non-poverty and backflows into poverty graphically through alluvial charts. We then calculate dynamic linear panel data models to describe the roles of the social welfare system, labor market attachment and asset consumption for poverty status and to measure poverty persistence. Following Vaalavuo and Sirniö 2022 we calculate linear probability models, rather than logistic regression models, since estimates from the former can be more readily compared across models with different regressors and over different spans of years (Mood 2010). We consider the following model (Muck 2022a):

$$y_{it} = a * y_{i(t-1)} + \beta^t x_{it} + \mu_i + E_{it}, \qquad (2.1)$$

where y_{it} is individual i's income or asset-based poverty status in year t, measured as a binary variable, $y_{i(t-1)}$ is i's income or asset-based poverty status in the previous year. x_{it} is a $k * it$ matrix of financial variables in logs which measure receipts from social insurances, labor market participation and asset consumption. We also include the financial amount of a household's

basic needs, gross rent and health insurance premia, which allows us to control for varying household compositions. μ_i is an individual-specific effect and E_{it} is an error-term.

Dynamic linear panel data models are difficult to estimate since the presence of the lagged dependent variable $y_{i(t-1)}$ in the equation introduces a bias due to the correlation of the lagged dependent variable with the error-term E_{it}. This bias is large when there are few time-periods t but many observed individuals i (as is the case with our data) which is known as "Nickell's bias" in the literature (Nickell 1981). Looking at Fixed-effects regression models (FE) and Pooled Ordinary least squares regression models (OLS) side-by-side is nevertheless useful, since the FE estimate is likely to be biased downwards, while the Pooled OLS estimate is likely to be biased upwards (Bond 2002). In other words, the FE and Pooled OLS estimators should bracket the true estimate for the lagged dependent variable.

Following this idea, our first specification is an FE model[12] for the years 2012 – 2015. This approach controls for any observed and unobserved time-invariant characteristics. However, time-varying unobserved characteristics (such as a change in health, a change of jobs or job loss) may still bias our results. By subtracting averages of observations across time, the FE estimator can be written as (Muck 2022a):

$$y_{it} - \hat{y}_i = a * (y_{i(t-1)} - \hat{y}_{i(-1)}) + \beta^t(x_{it} - \hat{x}_i) + (E_{it} + \hat{E}_i),$$

where $\hat{y}_i$, $\hat{x}_i$ and $\hat{E}_i$ are averages across time and $\hat{y}_{i(-1)}$ is the average of the lagged income or asset-based poverty status. Subtracting the averages cancels the individual-specific effect. Our second specification is a Pooled OLS model. It takes the form (Muck 2022b):

$$y_{it} = a * y_{i(t-1)} + \beta^t x_{it} + u_{it},$$

where instead of μ_i and E_{it} we have an error-term u_{it}.   The Pooled

---

[12]Calculations were done in the statistical software "R". We used the *plm* package version 2.6-2 to calculate Fixed-effects, Pooled OLS and system GMM models (c.f. Croissant und Millo 2008).

OLS model does not differentiate for an individual-specific effect. Our last specification is a System Generalized method of moments model (GMM) estimator. It is based on the first-difference (FD) estimator, which is obtained by subtracting (Muck 2022a):

$$y_{i(t-1)} = a * y_{i(t-2)} + \beta^t x_{i(t-1)} + \mu_i + E_{i(t-1)},$$

from (2.1), thereby giving:

$$y_{it} - y_{i(t-1)} = a * (y_{i(t-1)} - y_{i(t-2)}) + \beta^t(x_{it} - x_{i(t-1)}) + (E_{it} - E_{i(t-1)}).$$

Like the above estimators, the FD estimator is biased since $y_{i(t-1)}$ is correlated with $E_{i(t-1)}$. The System GMM estimator resolves this bias by using the twice lagged difference of the dependent variable ($y_{i(t-2)} - y_{i(t-3)}$) as an instrument for ($y_{i(t-1)} - y_{i(t-2)}$) and should provide consistent estimates which can be confronted to the FE and Pooled OLS estimates (Bond 2002). In our case, the panel data allows us to calculate the System GMM estimator for the most recent year (2015) including the lagged dependent variable for the previous year (2014), but no further as we do not have any instruments further back in the data.

4. Poverty flows

For the following analysis we focus on the 2012 income poor cohort (N = 73'231). We plot their flows from income poverty or asset-based poverty out to non-poverty and non-poverty with assets over the 2012 to 2015 period, as well as backflows into poverty following 2013. We also plot the 2012 income poverty and asset-based poverty rates for the respective population for reference, which are 9.3% and 4.8% respectively in the 2012 overall population.

In figure 2.2 we see that roughly half of the income poor population is also asset-based poor (51.1%) in 2012. The flows from the asset-based poor to the non-poor are bigger each year, than the flows from the income poor

but not asset-based poor to the non-poor. Moving to 2013, 31.7% of the 2012 income poor cohort have become non-poor, most of which have been asset-based poor the year before. However, the income poor but not asset-based poor make up the largest share of those who exit to non-poverty with assets. This is also due to the definition of the states of poverty and non-poverty. Income poor will move out to non-poor with assets if household incomes exceed expenses while their financial reserves are left unchanged, whereas asset-based poor will move out to non-poor without assets. Each year a fraction of the income poor becomes asset-based poor too, whereas a similar amount of asset-based poor become income poor but not asset-based poor.

Moving from 2013 onwards there is a bigger backflow from non-poverty to the asset-based poor each year, than there is from non-poverty to people that are only income poor but not asset-based poor. Most of the backflow into asset-based poverty stems from the non-poor without assets, whereas most of the backflow to people that are income-poor but not asset-based poor stems from the non-poor with assets, which again is also due to the definition of the poverty and non-poverty states. There is also a dynamic from non-poor without assets to non-poor with assets and vice-versa, the latter being slightly larger, since the group of non-poor without assets is also bigger to begin with starting in 2013. The flows between poverty and non-poverty are larger than the flows between the two states of poverty or between the two states of non-poverty. And the flows from poverty out to non-poverty are larger than the backflows into poverty. As a result, more people continue to exit poverty over the years, although this decrease is much weaker than the one from 2012 to 2013. Moving to 2014 38.5% of the 2012 income poor cohort have become non-poor and moving to 2015 this further increases to 42%.
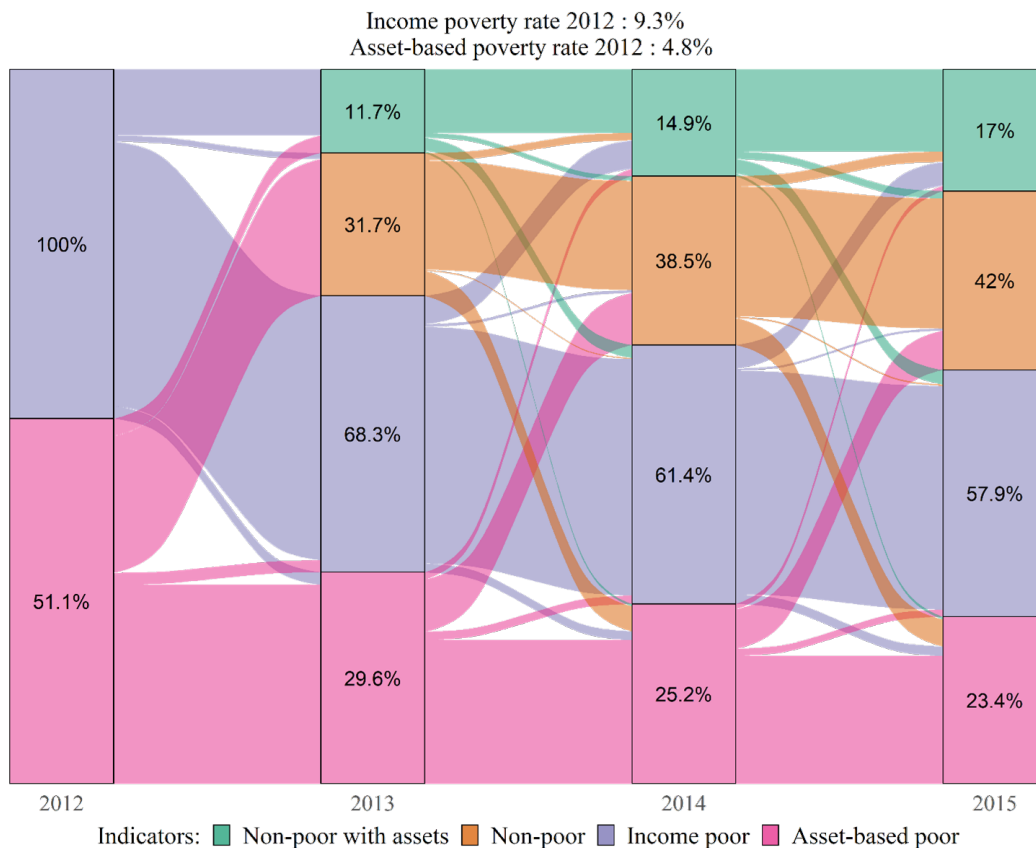
Income poverty rate 2012 : 9.3%
Asset-based poverty rate 2012 : 4.8%

Figure 1: Poverty flows for the income poor population 2012.

Note: Since asset-based poor are a subgroup of income poor, they are contained in the % for income poor. The same applies to non-poor with assets as a subgroup of non-poor. E.g. in 2013, 31.7% of the 2012 income poor population were non-poor, 20% were non-poor without assets and 11.7% were non-poor with assets. The % of the non-poor and income poor sums up to 100%. Source: WiSiER-data canton of Bern, 2012 - 2015, calculations inequalities

Over the four years, more than half of the asset-based poor have escaped poverty, decreasing from 51.1% to 23.4% in 2015. Less than half of the income poor have escaped poverty over the four years, decreasing from 100% down to 57.9%. This indicates that asset-based poverty is the easier poverty state to escape from. This seems counterintuitive, since escaping from asset-based

poverty should be harder due to the added lack of financial reserves, than escaping from income poverty. But it can be explained, if we consider that asset-based poor are able to get help in the form of social assistance due to the lack of financial reserves and that they may be under more pressure to do so. Whereas income poor may postpone reaching out for help and are unable to make a claim to social benefits.

Since we expect theses dynamics to differ for different phases in the life course, we present alluvial charts for persons aged 26 to 65 and pensioners. In figure 2.3 we see that for the population in retirement age although many are income poor (18.4% in 2012) only few are also asset-based poor (3.5%). This is to be expected since the old-age security system in Switzerland is based on old age pensions (old-age and survivor's insurance, occupational pension) and self-prevention in the form of financial assets. Private savings are rewarded with tax benefits, and regarding occupational pension plans when retirement age is reached there is a choice of whether the pension assets take the form of a rent or are in part paid out. Therefore, most retirees possess financial reserves to cover a 12-months period in case of insufficient income.

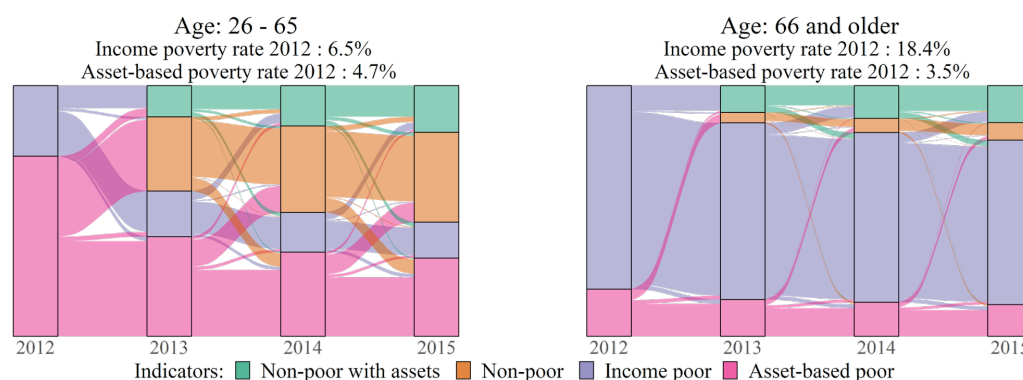Figure 2: Poverty flows for the income poor population 2012 for persons aged 26 - 65 and pensioners.
Source: WiSiER-data canton of Bern, 2012 - 2015, calculations inequalities

For persons aged 26 to 65 the income poverty rate is lower but also closer to the asset-based poverty rate. Many are at a stage in life where they have not yet accumulated financial reserves to cover expenses for a 12-months

period in case of insufficient income.

We also see that the flows out from poverty are much stronger for persons aged 26 to 65. Most of them escape poverty over the four years, whereas only a fraction of the population in retirement age does so. Although it is unlikely for the population in retirement age to be asset-based poor, it is more difficult for them to escape from income poverty, than for younger age groups, which live in households that are more strongly attached to the labor market.

Following this descriptive analysis we move on to assess the importance of the welfare system, labor market attachment and asset consumption for an escape from poverty and to measure poverty persistence.

5. Poverty persistence

The section on poverty flows has shown that the poverty dynamics are very different for pensioners and persons aged 26 to 65. For this reason, our analysis is carried out separately for the population in working age and children on the one hand and pensioners on the other. For each group, we present FE, Pooled OLS and system GMM models for income and asset-based poverty. Since our financial control variables run the risk of collinearity or even being colliders (e.g. main earner's income and taxes), we start out with models containing only the income or asset-based poverty status for the previous period as regressors to check that the estimate for the lagged dependent variable remains stable when moving to the full model.

Working age population and children

Table 2: Linear probability models for income poverty (0 / 1) with lagged income poverty status for working age population and children.

	Fixed effects	Pooled OLS	System GMM
Income-based poverty, t - 1	-0.149***	0.599***	0.276***
	(0.001)	(0.001)	(0.003)
Observations	1,882,339	1,882,339	649,104
R^2	0.022	0.324	
Adjusted R^2	-0.479	0.324	
F Statistic	28,416.880***	1,044,182.000***	
	(df = 1; 1244026)	(df = 1; 1882338)	
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 3: Linear probability models for asset-based poverty (0 / 1) with lagged asset-based poverty status for working age population and children.

	Fixed effects	Pooled OLS	System GMM
Asset-based poverty, t - 1	-0.155***	0.556***	0.250***
	(0.001)	(0.001)	(0.003)
Observations	1,882,339	1,882,339	649,104
R^2	0.025	0.290	
Adjusted R^2	-0.476	0.290	
F Statistic	31,331.630***	858,716.000***	
	(df = 1; 1244026)	(df = 1; 1882338)	
Note:			*p<0.1; **p<0.05; ***p<0.01

The FE estimates for income and asset-based poverty persistence are negative and suggest that past poverty status should decrease chances of poverty in the current period. This runs counter common understanding of the phenomenon and suggests that the FE estimate is biased downwards as expected, due to "Nickell's bias". The Pooled OLS estimates suggest strong poverty

persistence, with poverty in the previous period increasing the probability to be poor again in the current period by 59.9 percentage points for income poverty and 55.6 percentage points for asset-based poverty. As the Pooled OLS estimates are likely to be biased upwards, we prefer the system GMM estimates, which lie between the FE and Pooled OLS estimates. They suggest an increase of the probability to be poor in the current period by 27.6 and 25 percentage points for income and asses-based poverty respectively, due to poverty in the previous period.

Since the FE estimates are not reasonable and the Pooled OLS estimates are likely biased upwards, we only pursue the System GMM estimates for the full models.

Table 4: Linear probability models for income and asset-based poverty (0 / 1) with financial variables in logs and lagged income and asset-based poverty status for working age population and children.

	System GMM: Income poverty	System GMM: Asset-based poverty
Log of 1st earner's wages	-0.455***	-0.089***
	(0.069)	(0.014)
Log of 2nd earner's wages	-0.204***	-0.064***
	(0.028)	(0.005)
Log of income from real estate	0.034***	0.039***
	(0.001)	(0.0004)
Log of income from private transfers	-0.002***	-0.002***
	(0.0001)	(0.00005)
Log of stipends	0.008***	0.014***
	(0.002)	(0.002)
Log of supplementary benefits	-0.028***	-0.022***
	(0.0003)	(0.0003)
Log of social assistance	-0.009***	-0.005***
	(0.0002)	(0.0002)
Log of premium reductions	0.001***	0.0001**
	(0.0001)	(0.0001)
Log of maintenance advances	0.024***	0.025***
	(0.006)	(0.006)
Log of canton-specific aid	-0.006***	-0.003
	(0.002)	(0.002)
Log of social assistance for refugees	-0.039***	-0.037***
	(0.001)	(0.001)
Log of taxes	-0.048***	-0.039***
	(0.0005)	(0.0003)
Log of payments from private transfers	-0.003	0.001
	(0.004)	(0.004)
Log of liquidities	-0.003***	-0.009***
	(0.0001)	(0.0001)
Log of household basic needs	0.069***	0.044***
	(0.005)	(0.004)
Log of gross rent	-0.118***	-0.065***
	(0.007)	(0.005)
Log of health insurance premia	-0.001***	-0.002***
	(0.0002)	(0.0002)
Income-based poverty, t - 1	0.217***	
	(0.004)	
Asset-based poverty, t - 1		0.190***
		(0.003)
Observations	649,104	649,104
Note:		*p<0.1; **p<0.05; ***p<0.01

The estimates for poverty poversistence are smaller than in the models containing only the lagged dependent variable. Past poverty status increases the probability to be poor again in the current period by 21.7 percentage points for income-poverty and by 19 percentage points for asset-based poverty. Besides the estimates for the lagged dependent variables, the largest estimates are found for an increase in a household's main or secondary earner's income. Keeping in mind that these are "lin-log models", with the dependent (and lagged dependent) variables measured as dummy variables and the regressors measured in logs, a 1 percentage point increase of the income of a household's main earner reduces the probability to be income poor by approximately 0.5 percentage points and the probability to be asset-based poor by approximately 0.1 percentage points. It makes sense that the effect of an increase in income is greater on income poverty rather than asset-based poverty, where it is more direct. We also notice some peculiarities in the model, with both the estimates for an increase in taxes and a household's gross rent having a negative sign. Although these are expenses for a household, they also denote wealthier households. We move on to look at the respective models for pensioners.

Pensioners

Table 5: Linear probability models for income poverty (0 / 1) with lagged income poverty status for pensioners.

	Fixed effects	Pooled OLS	System GMM
Income-based poverty, $t-1$	-0.095***	0.878***	0.433***
	(0.002)	(0.001)	(0.007)
Observations	438,899	438,899	167,902
R^2	0.009	0.696	
Adjusted R^2	-0.544	0.696	
F Statistic	2,489.687***	1,333,407.000***	
	(df = 1; 281705)	(df = 1; 438898)	
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 6: Linear probability models for asset-based poverty (0 / 1) with lagged asset-based poverty status for pensioners.

	Fixed effects	Pooled OLS	System GMM
Asset-based poverty, t − 1	-0.087***	0.718***	0.427***
	(0.002)	(0.001)	(0.010)
Observations	438,899	438,899	167,902
R^2	0.007	0.485	
Adjusted R^2	-0.547	0.485	
F Statistic	2,007.669*** (df = 1; 281705)	438,662.200*** (df = 1; 438898)	

Note: *p<0.1; **p<0.05; ***p<0.01

The FE estimates for income and asset-based poverty persistence are again negative and not reasonable. The Pooled OLS estimates suggest very strong poverty persistence, with poverty in the previous period increasing the probability to be poor again in the current period by 87.8 percentage points for income poverty and 71.8 percentage points for asset-based poverty. The System GMM estimates suggest an increase of the probability to be poor in the current period by 43.3 and 42.7 percentage points for income and asses-based poverty respectively, due to poverty in the previous period. We notice how both the Pooled OLS and System GMM estimates are larger than for the younger age group, which is to be expected, since pensioners are less strongly attached to the labor market and therefore, if they are poor, are more likely to remain poor.

Table 7: Linear probability models for income and asset-based poverty (0 / 1) with financial variables in logs and lagged income and asset-based poverty status for pensioners.

	System GMM: Income poverty	System GMM: Asset-based poverty
Log of 1st earner's wages	-2.070***	-0.334***
	(0.225)	(0.040)
Log of 2nd earner's wages	-1.488***	-0.379***
	(0.112)	(0.027)
Log of income from real estate	-0.130***	0.019***
	(0.002)	(0.001)
Log of income from private transfers	-0.017***	-0.004***
	(0.0004)	(0.0002)
Log of OASI	-0.363***	-0.206***
	(0.010)	(0.005)
Log of pensions, 2nd pillar	-0.265***	-0.017***
	(0.003)	(0.001)
Log of pensions, 3rd pillar	-0.029***	0.006***
	(0.002)	(0.001)
Log of pensions, other	-0.160***	-0.020***
	(0.004)	(0.001)
Log of supplementary benefits	-0.046***	-0.016***
	(0.0005)	(0.0003)
Log of social assistance	-0.019***	-0.007***
	(0.001)	(0.001)
Log of premium reductions	0.016***	0.007***
	(0.0003)	(0.0002)
Log of canton-specific aid	-0.008***	-0.007***
	(0.001)	(0.001)
Log of taxes	-0.016***	-0.008***
	(0.001)	(0.0004)
Log of payments from private transfers	0.130	-0.011
	(0.225)	(0.032)
Log of liquidities	0.011***	-0.014***
	(0.0002)	(0.0003)
Log of household basic needs	0.623***	0.238***
	(0.033)	(0.011)
Log of gross rent	-0.901***	-0.291***
	(0.048)	(0.015)
Log of health insurance premia	0.013*	0.012***
	(0.007)	(0.003)
Income-based poverty, t - 1	0.291***	
	(0.006)	
Asset-based poverty, t - 1		0.305***
		(0.010)
Observations	167,902	167,902

Note: *p<0.1; **p<0.05; ***p<0.01

Again estimates for poverty poversistence are smaller than in the models containing only the lagged dependent variable, but larger than for the younger group. For pensioners past poverty status increases the probability to be poor again in the current period by 29.1 percentage points for income-poverty and by 30.5 percentage points for asset-based poverty. Besides the estimates for the lagged dependent variables, the largest estimates are again found for an increase in a household's main or secondary earner's income. An increase of the income of a household's main earner by 1 percentage point reduces the probability to be income poor by approximately 2.1 percentage points and the probability to be asset-based poor by approximately 0.3 percentage points. We notice that this effect of an increase in the main earner's income on income poverty is much larger than for the younger group. It is unusual for pensioners to have a labor market income, which generally makes them likely to be income poor. But pensioners that do have a labor market income are much less likely to be income poor, respectively. Continuing in the order of magnitude, an increase of a household's gross rent decreases the probability to be income or asset-based poor, again denoting wealthier households. While an increase in a household's basic needs increases the probabilty to be income or asset-based poor. We also notice the importance of the OASI, other pensions and incomes from real estate to reduce the probability of being income or asset-based poor for pensioners.

6. Conclusion

To answer our research question (1), we conclude that generally asset-based poverty is the more dynamic state and easier to escape from than income poverty. We have seen this in initial descriptive statistics showing that a larger share of the population is income poor in all four observed years rather than in exactly two or three years, which we do not find for asset-based poverty. Alluvial charts show that in the 2012 income poor population a larger share of the asset-based poor escapes asset-based poverty than the respective share for the income poor. Our analytical results confirm this,

with the exception of the estimate for asset-based poverty persistence for pensioners (0.305), which is larger than the respective estimate for income poverty persistence (0.291).

The finding that asset-based poverty is the more dynamic state and easier to escape from than income poverty may have much to do with the benefit system in Switzerland which requires depletion of financial assets below a certain threshold before a claim to social assistance can be made. This may require persons and households which are unable to leave income poverty out of their own resources, to first enter asset-based poverty before leaving poverty.

To answer our research question (2), we conclude that poverty, especially income poverty, is persistent. Only 57.9% of the 2012 income poor population escape income poverty over the observed four years. The surest way out of income or asset-based poverty is a household's strong attachment to the labor market. The importance of labor market attachment to avoid income and asset-based poverty is consistent with the literature and is also found for results with the same data in a cross-sectional perspective (c.f. Hümbelin et al. 2022). For pensioners, we also notice the importance of the OASI, other pensions and incomes from real estate to reduce the probability of being income or asset-based poor.

Although we observe many individuals in the data we used, the time-series is quite short and comprises only four years. Drawing on data from the social security earnings records (SSER[13]), which are available from 1981 (c.f. Kalambaden and Martınez 2021), would considerably lengthen the time-series. A longer time-series would decrease the "Nickell's bias" which our FE estimates have suffered from. Strictly speaking, the SSER data would not allow us to study poverty persistence. But they would allow us to study low-income persistence and the persistence of low-income into poverty with further lags. This could be an interesting exercise to better understand low-income dynamics and the importance of low-income trajectories for poverty.

---

[13]https://www.zas.admin.ch/zas/en/home/services-en-ligne/particuliers/extrait-du-compte-individuel.html, last visited on 04.06.2023.

Bibliography

[1] Samira Ali et al. ""Feeling Less Than a Second Class Citizen": Examining the Emotional Consequences of Poverty in New York City". en. In: *Journal of Family Issues* 39.10 (July 2018), pp. 2781–2805.

[2] S. Alkire and M. Apablaza. "Multidimensional poverty in Europe 2006–2012: illustrating a methodology". en. In: *Oxford Poverty and Human Development Initiative Working Papers* (2016). issn: 2040-8188. url: https:// ora. ox . ac. uk / objects/ uuid: e28d3bc0 - a74a-4034-a333-f3fc09fe8c2f (visited on 05/24/2021).

[3] Eirini Andriopoulou and Panogiotis Tsakloglou. "Once Poor, Always Poor? Do Initial Conditions Matter? Evidence from the ECHP". en. In: *SSRN Electronic Journal* (2011). issn: 1556-5068. doi: 10.2139/ssrn.1933328. url: https://www.ssrn.com/abstract=1933328 (visited on 08/25/2023).

[4] Eirini Andriopoulou and Panogiotis Tsakloglou. "The Determinants of Poverty Transitions in Europe and the Role of Duration Dependence". en. In: *SSRN Electronic Journal* (2011). issn: 1556-5068. doi: 10.2139/ssrn.1842089. url: https://www.ssrn.com/abstract=1842089 (visited on 01/05/2023).

[5] Mary Jo Bane and David T. Ellwood. "Slipping into and out of Poverty: The Dynamics of Spells". en. In: *The Journal of Human Resources* 21.1 (Winter 1986), pp. 1–23.

[6] Martin Biewen. "Measuring state dependence in individual poverty histories when there is feedback to employment status and household composition". en. In: *Journal of Applied Econometrics* 24.7 (Nov. 2009), pp. 1095–1116.

[7]   BKSE. *Handbuch Sozialhilfe – Stichwort Grundbedarf für den Lebensunterhalt (GBL).* 2020. url: http://handbuch.bernerkonferenz. ch/stichwoerter/stichwort/detail/grundbedarf-   fuer-   den-lebensunterhalt-gbl/ (visited on 05/24/2022).

[8]   Stephen R Bond. "Dynamic panel data models: a guide to micro data methods and practice". en. In: *Portuguese Economic Journal* 1.2 (Aug. 2002), pp. 141–162.

[9]   J. Bound et al. "Poverty Dynamics in Widowhood". en. In: *Journal of Gerontology* 46.3 (May 1991), S115–S124.

[10]   Andrea Brandolini, Silvia Magri, and Timothy M. Smeeding. "Asset-based measurement of poverty". en. In: *Journal of Policy Analysis and Management* 29.2 (2010), pp. 267–284.

[11]   Monica Budowski, Robin Tillmann, and Manfred Max Bergman. "Poverty, Stratification and Gender in Switzerland". In: *Swiss Journal of Sociology* 28.2 (2002), pp. 297–317.

[12]   Mindy S. Crandall and Bruce A. Weber. "Local Social and Economic Conditions, Spatial Concentrations of Poverty, and Poverty Dynamics". en. In: *American Journal of Agricultural Economics* 86.5 (Dec. 2004), pp. 1276–1281.

[13]   Yves Croissant and Giovanni Millo. "Panel Data Econometrics in R : The plm Package". en. In: *Journal of Statistical Software* 27.2 (July 2008), pp. 1–43.

[14]   Francesco Devicienti. "Estimating poverty persistence in Britain". en. In: *Empirical Economics* 40.3 (May 2011), pp. 657–686.

[15]   Francesco Devicienti, Valentina Gualtieri, and Mariacristina Rossi. "THE PERSISTENCE OF INCOME POVERTY AND LIFESTYLE DEPRIVATION: EVIDENCE FROM ITALY". en. In: *Bulletin of Economic Research* 66.3 (July 2014), pp. 246–278.

[16]   Ross Finnie and Arthur Sweetman. "Poverty dynamics: empirical evidence for Canada". en. In: *Canadian Journal of Economics/Revue Canadienne d'Economique* 36.2 (May 2003), pp. 291–325.

[17] Didier Fouarge and Richard Layte. "Welfare Regimes and Poverty Dynamics: The Duration and Recurrence of Poverty Spells in Europe". en. In: *Journal of Social Policy* 34.3 (July 2005), pp. 407–426.

[18] FSO. *Armut in der Schweiz: Konzepte, Resultate und Methoden Ergebnisse auf der Basis von SILC 2008 bis 2010*. Bundesamt für Statistik (BFS), 2012. isbn: 978-3-303-20028-5.

[19] FSO. *Poverty*. de. Nov. 2020. url: https://www.bfs.admin.ch/bfs/ de /home /statistiken/wirtschaftliche- soziale- situation- bevoelkerung / wohlbefinden - armut / armut - und - materielle - entbehrungen/armut.html (visited on 06/04/2021).

[20] Rainer Gabriel et al. "The persistence of social stratification? A life course perspective on poverty in old-age in Switzerland". en. In: *Swiss journal of Sociology* 41.3 (2015), pp. 465–487.^

[21] Elisabeth Gutjahr and Jean-Luc Heeb. "Social assistance trajectories in Switzerland: do they follow discernible patterns?" en. In: *European Journal of Social Work* 19.3-4 (July 2016), pp. 570–585.

[22] Oliver Hümbelin and Rudolf Farys. "The suitability of tax data to study trends in inequality — A theoretical and empirical review with tax data from Switzerland". en. In: *Research in Social Stratification and Mobility* 44 (June 2016), pp. 136–150.

[23] Oliver Hümbelin and Tobias Fritschi. "Pathways into and out of the Labor Market After Receiving Social Benefits: Cumulative Disadvan- tage or Life Course Risk?" In: *The Sociological Quarterly* 59.4 (Oct. 2018), pp. 627–654.

[24] Oliver Hümbelin, Lukas Hobi, and Robert Fluder. "Rich cities, poor countryside? Social structure of the poor and poverty risks in urban and rural places in an affluent country". en. In: *Local Economy* 37.3 (May 2022), pp. 169–193.

[25] Sarah Jarvis and Stephen P. Jenkins. "Low Income Dynamics in 1990s Britain". en. In: *Fiscal Studies* 18.2 (May 1997), pp. 123–142.

[26] Stephen P Jenkins. "Modelling household income dynamics". en. In: *Journal of Population Economics* 13.4 (Dec. 2000), pp. 529–567.

[27] Preetha Kalambaden and Isabel Z. Martınez. *Intergenerational Mobility Along Multiple Dimensions Evidence from Switzerland.* en. Preliminary and incomplete version for conference submission, Aug. 2021.

[28] Richard Layte and Christopher Whelan. "Moving in and out of poverty". en. In: *European Societies* 5.2 (Jan. 2003), pp. 167–191.

[29] Richard Layte and Christopher T. Whelan. "Cumulative Disadvantage Or Individualisation? A Comparative Analysis Of Poverty Risk And Incidence". en. In: *European Societies* 4.2 (Jan. 2002),
pp. 209–233.

[30] Robert E. Leu, Stefan Burri, and Tom Priester. *Lebensqualität und Armut in der Schweiz.* de. Bern: Haupt, 1997. isbn: 978-3-258-05570- 1.

[31] Carina Mood. "Logistic Regression: Why We Cannot Do What We Think We Can Do, and What We Can Do About It". en. In: *European Sociological Review* 26.1 (Feb. 2010), pp. 67–82.

[32] Carina Mood. "The not-very-rich and the very poor: Poverty persistence and poverty concentration in Sweden". en. In: *Journal of European Social Policy* 25.3 (July 2015), pp. 316–330.

[33] Carina Mood and Jan O. Jonsson. "The Social Consequences of Poverty: An Empirical Test on Longitudinal Data". en. In: *Social Indicators Research* 127.2 (June 2016), pp. 633–652.

[34] Jakub Muck. *Dynamic panel data models. Nickell's Bias. Anderson- Hsiao estimator. Arellano-Bond estimator. System GMM estimator.* en. SGH Warsaw School of Economics, 2022. url: https://web.sgh.waw.pl/~jmuck/AAE/AdvancedAppliedEconometrics12.pdf (visited on 08/27/2023).

[35]   Jakub Muck. *Panel data. Between and within variation. Random and fixed effects models. Between regression. Hausman-Taylor estimator*. en. SGH Warsaw School of Economics, 2022. url: https://web.sgh.waw.pl/~jmuck/AAE/AdvancedAppliedEconometrics 9.pdf   (visited on 08/27/2023).

[36]   Stephen Nickell. "Biases in Dynamic Models with Fixed Effects". en. In: *Econometrica* 49.6 (Nov. 1981), pp. 1417–1426.

[37]   Michel Oris et al. "Long Lives and Old Age Poverty: Social Stratification and Life-Course Institutionalization in Switzerland". en. In: *Research in Human Development* 14.1 (Jan. 2017), pp. 68–87.

[38]   Howard Oxley, Thai Thanh Dang, and Pablo Antol′ın. *POVERTY DYNAMICS IN SIX OECD COUNTRIES*. en. OECD Economic Studies No. 30, 2000.

[39]   Steven Pressman and Robert Scott. "Consumer Debt and the Measurement of Poverty and Inequality in the US". en. In: *Review of Social Economy* 67.2 (June 2009), pp. 127–148.

[40]   Steven Pressman and Robert H. Scott. "Who are the Debt Poor?" en. In: *Journal of Economic Issues* 43.2 (June 2009), pp. 423–432.

[41]   Renate Salzgeber, Tobias Fritschi, and Thomas Graf. *Zeitliche Verläufe in der Sozialhilfe*. de. Berner Fachhochschule Soziale Arbeit, May 2010.

[42]   Noel Smith, Sue Middleton, and Joseph Rowntree Foundation. *A review of poverty dynamics research in the UK*. en. York: Jospeh Rowntree Foundation, 2007. isbn: 978-1-85935-577-0. url: http://   www.jrf.org.uk/bookshop/eBooks/2040-poverty- dynamics- review.pdf (visited on 07/05/2021).

[43]   Schweizerische Konferenz für Sozialhilfe. *Armut und Armutsgrenze. Grundlagenpapier der SKOS*. Bern, Switzerland: SKOS, 2015.

[44]   Ann Huff Stevens. "Climbing out of Poverty, Falling Back in: Measuring the Persistence of Poverty Over Multiple Spells". en. In: *The Journal of Human Resources* 34.3 (Summer 1999), pp. 557–588.

[45] Ann Huff Stevens. "The dynamics of poverty spells: updating Bane and Ellwood". In: *The American Economic Review* 84.2 (May 1994), pp. 34–37.

[46] UN. *Guide on Poverty Measurement*. New York, Geneva: United Nations, 2017.

[47] Maria Vaalavuo. *Poverty dynamics in Europe – From what to why*. Working Paper 03: European Union, Nov. 2015. doi: 10 . 2767 / 956213. (Visited on 08/27/2023).

[48] Maria Vaalavuo and Outi Sirniö. "Jobs against poverty: a fixed-effects analysis on the link between gaining employment and exiting poverty in Europe". en. In: *European Societies* 24.4 (Aug. 2022), pp. 431–462.