

# ADAPTATION TO POVERTY IN LONG-RUN PANEL DATA

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*Abstract*—We consider the link between poverty and subjective well-being and focus in particular on potential adaptation to poverty. We use panel data on almost 54,000 individuals living in Germany from 1985 to 2012 to show, first, that life satisfaction falls with both the incidence and intensity of contemporaneous poverty. We then reveal that there is little evidence of adaptation within a poverty spell: poverty starts bad and stays bad in terms of subjective well-being. We cannot identify any cause of poverty entry that explains the overall lack of poverty adaptation.

## I. Introduction

THE relationship between an individual's income and subjective well-being has been the focus of much empirical work, both within and across countries and at a single point in time and over time. This research has come to three main conclusions: (a) within each country at a given point in time, richer people are more satisfied with their lives, with additional income increasing satisfaction at a decreasing rate; (b) within each country over time, rising average income often does not substantially increase satisfaction with life; and (c) across countries, on average, individuals living in richer countries are more satisfied with their lives than are those living in poorer countries (see, among many others, Blanchflower & Oswald, 2004; Clark, et al., 2008; Diener & Biswas-Diener, 2002, Diener et al., 2010; Di Tella & MacCulloch, 2006; Easterlin, 1995; Frey & Stutzer, 2002; Senik, 2005).

The vast majority of the empirical research in the fast-growing field of subjective well-being research has been resolutely atemporal, with some measure of current well-being being correlated with the current levels of explanatory

variables. This applies to the analysis of both income and other commonly analyzed correlates of well-being, such as marital or labor force status. However, at the same time, there is a common suspicion in economics, and likely across the social sciences in general, that the past matters: it is not only where you are now but also how you got there. In this context, there has been particular interest in adaptation, whereby the evaluation of current situations may depend on the situations that have been experienced in the past.<sup>1</sup> A related theoretical literature in economics has proposed models of habit formation (Gorman, 1967; Pollak, 1970; Spinnewyn, 1981).

While it is possible to look for empirical evidence of adaptation via revealed preferences (either experimentally or using survey data, as in Hotz, Kydland, & Sedlacek, 1988), recent work has appealed to subjective well-being data in this context. Here, well-being at time  $t$  is related to the individual explanatory variables measured not only at the same point in time but also with respect to their past (or even future) values. It is thus possible to trace out the profile of well-being around a particular event—a pay raise, a marriage, a divorce, migration, or the entry into unemployment, among others (see Clark, Diener, et al., 2008; Clark & Georgellis, 2013; Frijters, Johnston, & Shields, 2011; Nowok, et al., 2013; Oswald & Powdthavee, 2008). This literature has broadly concluded in favor of adaptation for many life events, but not for unemployment. In particular, Clark, Diener, et al. (2008) show that the duration of unemployment does not matter in well-being terms for those who are still unemployed.

Perhaps surprisingly, there has not been much work on adaptation to income. Using the same Germanic Socio-Economic Panel (SOEP) data as we do, Di Tella, Haisken-De New, and MacCulloch (2010) find complete adaptation to changes in income within four years (see also Di Tella & MacCulloch, 2010). This adaptation is found to be more salient for women, left wingers, and employees (as opposed to men, right wingers, and the self-employed). The role of income in explaining well-being is contrasted to that of professional status (matched in from the Standard International Occupational Prestige Scale, via the individual's occupation), for which no adaptation is found. An earlier contribution (Clark, 1999) suggests that adaptation to changes in labor income (while staying in the same job at the same firm) in British Household Panel Survey (BHPS) data occurs within one year.

<sup>1</sup> Adaptation is suggested by Kahneman and Tversky (1979) as one reason that evaluations of situations depend on changes relative to a reference situation rather than absolute magnitudes: "An object at a given temperature may be experienced as hot or cold to the touch depending on the temperature to which one has adapted. The same principle applies to non-sensory attributes such as health, prestige and wealth" (p. 277).

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These adaptation to income results can be proposed as one possible explanation of the Easterlin (1974) paradox, that average life satisfaction remains constant within a country despite consistent economic growth (see Clark, 2016, for a survey).

Both of the contributions cited above consider income as a continuous variable and analyze all income changes. We here specifically focus on the event of entry into low income or poverty. This analysis of poverty as a state allows us to apply exactly the same empirical techniques as have been used to plot out any adaptation to divorce, marriage, and unemployment (for example) in data from the SOEP (Clark, Diener et al., 2008), the BHPS (Clark & Georgellis, 2013), and the Household Income and Labour Dynamics in Australia (HILDA) survey (Frijters et al., 2011).

We are interested in possible adaptation to low income or poverty for two reasons. First, it has seemingly hitherto been neglected in the related empirical work.<sup>2</sup> Second, and at a far broader level, there is a vibrant ongoing debate about subjective well-being as a possible complementary measure of progress at the national level (a useful recent discussion appears in Fleurbaey & Blanchet, 2013). One mooted drawback to any such use is that self-reports may not adequately reflect the individual's true level of well-being. In particular, negative shocks may lead individuals to revise their understanding of the subjective response scale. If this process takes time, we will then automatically see adaptation or a bounce back of well-being scores; however, this will not reflect what individuals actually feel.

In the specific context of poverty, Sen (1990, p. 45) writes:

A thoroughly deprived person, leading a very reduced life, might not appear to be badly off in terms of the mental metric of utility, if the hardship is accepted with non-grumbling resignation. In situations of longstanding deprivation, the victims do not go on weeping all the time, and very often make great efforts to take pleasure in small mercies and cut down personal desires to modest—"realistic"—proportions. The person's deprivation then, may not at all show up in the metrics of pleasure, desire fulfillment, etc., even though he or she may be quite unable to be adequately nourished, decently clothed, minimally educated and so on.

This critique is sometimes referred to as that of the "happy slave," whereby self-reports are an inadequate measure of real welfare.

Alternatively, it could be the case that subjective well-being scores are indeed good measures of individual welfare: movements in such scores over time will then reflect real phenomena. But finding evidence of real adaptation to

poverty still raises a number of ethical concerns, especially among development specialists: if there is adaptation to (low) income, then we should arguably worry less about the poor and the deprived (for an extensive discussion, see Clark, 2009) and policy should put less emphasis on poverty eradication. The question here is of which measure to act on: Does the report of an adequate level of subjective well-being mean that we should ignore individuals' objective difficulties?

This interest in adaptation to poverty has not been matched by empirical analysis. Both of the issues outlined above (real adaptation to poverty and shifting response scales<sup>3</sup>) are moot if there is actually no empirical evidence of adaptation. We here fill this gap, using 28 years of large-scale panel data. We first show that, as might be expected given existing work on income and well-being, poverty per se is associated with lower life satisfaction. Regarding our main concern, adaptation, we find little evidence that the poor say that over time, they have become satisfied with less. The (lack of) adaptation results are robust to various model specifications and to concerns about selection into poverty length. The degree of adaptation depends to some extent on the reasons that people entered into poverty in the first place, although we cannot identify any common cause of poverty entry that would explain the overall lack of well-being adaptation in our data.

The remainder of the paper is organized as follows. Section II briefly reviews the question of poverty measurement and presents the SOEP panel data that we use. Section III describes the results, and section IV concludes.

## II. Measuring Poverty and Data

The seminal contribution to poverty measurement is Sen (1976), who distinguishes two fundamental issues: identifying the poor in the population under consideration and constructing an index of poverty using the available information on the poor. The first problem has been dealt with in the literature by setting a poverty line and identifying as poor all individuals with incomes below this threshold. The way in which this poverty line is determined remains very much debated and differs considerably from one country to another (for an extensive survey, see World Bank, 2005). In this paper, we follow the European Union approach, in which the poverty line equals 60% of the national median equivalent income. It is hard to know whether this is the "right" poverty line, and we carry out robustness checks to this extent below. Regarding the second issue, the aggregation problem, many indices have been proposed that capture not only the fraction of the population that is poor or the incidence of poverty (the head count ratio) but also the extent of individual poverty and inequality among those who are poor.

<sup>3</sup> These two phenomena correspond to what Kahneman (1999) calls the hedonic and satisfaction treadmills.

<sup>2</sup> Income movements into poverty are likely only a small minority of the income changes (which are both up and down) in Di Tella et al. (2010), so that their finding of overall adaptation to income changes does not tell us about specific adaptation to poverty. It can also be argued that we are particularly interested in the well-being experience of poverty for Rawlsian reasons, in that we would like to give a particular weight to the avoidance of misery.

Let  $x = (x_1, x_2, \dots, x_n)$  be the distribution of income among  $n$  individuals, where  $x_i \geq 0$  is the income of individual  $i$ . For expositional convenience, we assume that the income distribution is nondecreasingly ranked, that is, for all  $x$ ,  $x_1 \leq x_2 \leq \dots \leq x_n$ . We denote the poverty line by  $z$ . For any income distribution,  $x$ , individual  $i$  is said to be poor if  $x_i < z$ . The normalized deprivation of individual  $i$  who is poor with respect to  $z$  is given by his or her relative shortfall from the poverty line:

$$d_i^\alpha = \left( \frac{z - x_i}{z} \right)^\alpha, \quad (1)$$

where  $\alpha \geq 0$  is a parameter. When  $\alpha = 0$ , the only dimension of poverty that counts is its incidence, as normalized deprivation is equal to 1 for all of the poor. When  $\alpha = 1$ , normalized deprivation also reflects the intensity of poverty, with a higher value of  $d$  being assigned to poorer individuals. The normalized deprivation score for the rich—those whose incomes (weakly) exceed  $z$ —is always set equal to 0.

The empirical analysis is carried out using one of the most extensively used panel data sets in the literature on subjective well-being, the German Socio-Economic Panel (SOEP), an ongoing panel survey with yearly reinterviews (see <http://www.diw.de/gsoep>). The starting sample in 1984 was almost 6,000 households based on a random multistage sampling design. A sample of about 2,200 East German households was added in June 1990, half a year after the fall of the Berlin Wall.<sup>4</sup> This gives a very good picture of the GDR society on the eve of the German currency and social and economic unification, which took place on July 1, 1990. In 1994–1995, an additional subsample of 500 immigrant households was included to capture the massive influx of immigrants since the late 1980s. An oversampling of rich households was added in 2002, improving the quality of inequality analyses, especially at the upper end of the distribution. Finally, in 1998, 2000, 2006, and 2011, four additional population-representative random samples were added, boosting the overall number of interviewed households in the 2011 survey year to about 12,300, covering approximately 21,000 individuals over age 16.

We look at poverty and well-being over the period 1985 to 2012.<sup>5</sup> The initial sample consists of all adult respondents with valid information on income and life satisfaction, leaving us with approximately 440,000 observations on about 54,000 individuals in West and (from 1992 on) East Germany.

We use annual equivalent household income, via an equivalence scale with an elasticity of 0.5 (i.e., the square root of household size). The poverty line per year is then set at 60% of the country-level median equivalent household income. An individual is poor if her equivalent income is below this value. The 60% income level is calculated from

the SOEP using sampling weights, so that we are not affected by the oversampling described above. Individuals in the SOEP are interviewed at the beginning of the year and report income received in the previous year so that income in the 2012 wave, say, refers to that received by the household in 2011. Because we use household income to calculate poverty, we cluster all our standard errors at the household-wave level in the empirical analysis.

Our dependent well-being measure, life satisfaction, is measured on an 11-point scale. Subjects were asked the following question: “In conclusion, we would like to ask you about your satisfaction with your life in general. Please answer according to the following scale: 0 means completely dissatisfied and 10 means completely satisfied: How satisfied are you with your life, all things considered?” The life satisfaction score for individual  $i$  in year  $t$  is denoted below by  $wb_{it}$ .

As in much of the well-being literature, we estimate fixed-effects regressions, allowing us to control for unobserved time-invariant individual characteristics and the potential different use of the underlying satisfaction scale across individuals. The general model is

$$wb_{it} = \alpha_i + \gamma_t + \beta C_{it} + \theta PI_{it} + \varepsilon_{it}, \quad (2)$$

where  $C_{it}$  is the set of time-varying individual covariates and  $PI_{it}$  is some poverty measure at the individual level. With the fixed effect in equation (2), the coefficients are identified off within-subject variations. We use “within” fixed-effect linear regressions (as justified in Ferrer-i-Carbonell & Frijters, 2004).

The variables in  $C_{it}$  are age (eight age groups, from 16 to 20 to 80+ years old), marital status, labor force status, residency in East or West Germany, education (high school, less than high school, and more than high school), number of children in the household, and wave dummies. The individual fixed effect captures all time-invariant variables, including sex and immigration status. The analysis is carried out for both the whole sample and then separately for men and women, inspired by work showing that adaptation to various life events differs by sex (see, e.g., Clark, Diener, et al., 2008).

The descriptive statistics appear in table 1. Our 438,000 observations correspond to almost 54,000 subjects, who are thus observed on average a little over eight years each. The majority of observations are on individuals of working age, who are either married (64%) or single (22%), and with a high school education (59%) or higher (18%). Six out of ten respondents were working at the time of the survey. Around 12% of observations correspond to respondents whose equivalent income was below 60% of the yearly median household income that year: these are the observations corresponding to the poor in our empirical analysis.<sup>6</sup>

<sup>4</sup> Household income for the East German sample is available only from 1992.

<sup>5</sup> We do not use the first 1984 wave, since the questions on capital and pension incomes were asked differently there.

<sup>6</sup> Around 15% of individuals are classified as being in poverty in at least one year of our sample of the SOEP data.

TABLE 1.—DESCRIPTIVE STATISTICS

Variable	Mean	Standard Deviation
Life satisfaction (0–10)	6.997	1.812
Below poverty line ( $d^0$ )	0.118	0.322
Relative poverty gap ( $d^1$ )	0.028	0.102
Employed	0.592	0.491
Unemployed	0.052	0.222
Retired	0.160	0.367
Inactive	0.195	0.396
Age: 16–20	0.039	0.193
Age: 21–30	0.163	0.370
Age: 31–40	0.191	0.393
Age: 41–50	0.197	0.398
Age: 51–60	0.168	0.374
Age: 61–70	0.137	0.344
Age: 71–80	0.079	0.269
Age: 80+	0.026	0.160
Female	0.482	0.500
Education < high school	0.231	0.422
Education = high school	0.587	0.492
Education > high school	0.181	0.385
Number of children in household	0.575	0.934
Married	0.637	0.481
Single	0.218	0.413
Widowed	0.065	0.247
Divorced	0.063	0.243
Separated	0.016	0.127
East	0.213	0.410
Number of observations	438,159	
Number of subjects	53,867	

The  $d^1$  figure shows that individuals in poverty lived in households with equivalent household income that was on average 24% below the poverty line (= 0.028/0.118). The average value of our dependent variable, life satisfaction, is close to 7 on the 0 to 10 scale, indicating that there are no striking ceiling or floor effects on average.

### III. Regression Results

#### A. Life Satisfaction and the Incidence and Intensity of Poverty

We start with the simplest question: what is the effect of contemporaneous poverty on subjective well-being? We are not aware of any work relating income poverty and life satisfaction in a multivariate setting. We here consider both the incidence and intensity of poverty ( $d^0$  and  $d^1$  in the terminology above). Table 2 shows the results from fixed-effect life-satisfaction regressions.

The control variables in these regressions attract the expected coefficients: life satisfaction is U-shaped in age, at least up to age 80. The educated, especially women, are significantly more satisfied. Those who marry (the omitted category here) are more satisfied, while widowhood, divorce, and separation are associated with lower life satisfaction, especially for men. With respect to labor force status, unemployment has a large negative estimated coefficient, as is common in the literature.

More novel, and central to our research question, are the coefficients on the poverty measures. At the top of table 2,

TABLE 2.—LIFE SATISFACTION AND POVERTY INCIDENCE AND INTENSITY: FIXED-EFFECTS REGRESSIONS

	Whole Sample	Men	Women
$d^0$	−0.138*** (0.015)	−0.121*** (0.020)	−0.153*** (0.017)
$d^1$	−0.429*** (0.046)	−0.339*** (0.067)	−0.486*** (0.056)
Unemployed	−0.683*** (0.014)	−0.833*** (0.020)	−0.532*** (0.019)
Retired	−0.113*** (0.014)	−0.212*** (0.019)	−0.032* (0.019)
Inactive	−0.121*** (0.008)	−0.255*** (0.014)	−0.033*** (0.011)
Age: 16–20	0.055** (0.026)	0.204*** (0.037)	−0.087** (0.037)
Age: 21–30	−0.029 (0.018)	0.029 (0.025)	−0.083*** (0.025)
Age: 31–40	−0.012 (0.011)	0.020 (0.015)	−0.041*** (0.015)
Age: 51–60	0.039*** (0.012)	0.026 (0.016)	0.051*** (0.016)
Age: 61–70	0.267*** (0.019)	0.301*** (0.026)	0.251*** (0.026)
Age: 71–80	0.122*** (0.026)	0.106*** (0.036)	0.146*** (0.036)
Age: 80–max	−0.236*** (0.038)	−0.264*** (0.054)	−0.202*** (0.051)
Education = high school	0.011 (0.014)	−0.028 (0.020)	0.052*** (0.019)
Education > high school	0.105*** (0.019)	0.057** (0.027)	0.136*** (0.026)
Single	−0.161*** (0.015)	−0.131*** (0.019)	−0.158*** (0.020)
Widowed	−0.231*** (0.024)	−0.253*** (0.044)	−0.211*** (0.028)
Divorced	−0.067*** (0.019)	−0.101*** (0.027)	−0.029 (0.025)
Separated	−0.367*** (0.025)	−0.486*** (0.036)	−0.248*** (0.034)
East Germany	−0.281*** (0.036)	−0.254*** (0.048)	−0.301*** (0.045)
Number of children in household	0.008 (0.005)	0.014** (0.006)	−0.008 (0.007)
Constant	7.733*** (0.0289)	7.665*** (0.0382)	7.769*** (0.0362)
$R^2$	0.03	0.04	0.03
$N$	438,159	211,096	227,063

Robust standard errors in parentheses. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

both the incidence ( $d^0$ ) and intensity ( $d^1$ ) of poverty are significantly negatively correlated with life satisfaction. The estimated effect of poverty in table 2 is large in size. An individual who lives in a household that is just below the poverty line (so that  $d^0=1$  and  $d^1$  is almost 0) has a life satisfaction score that is 0.138 points lower than the same person when he or she is not poor; this effect is of the same magnitude as the happiness boost from marriage. An individual who lives in a household with an income that is half of the poverty line (so that  $d^0 = 1$  and  $d^1$ , the normalized distance from the poverty line, is 0.5) has a life satisfaction score that is  $0.138 + 0.5 \times 0.429 = 0.352$  points lower than the same person when not poor. This figure is about as large as the drop in satisfaction following separation.

Much empirical work has revealed a positive relationship between income and various measures of subjective well-

TABLE 3.—ADAPTATION TO POVERTY: FIXED-EFFECTS REGRESSIONS

	Whole Sample	Men	Women
Poverty 0–1 years	–0.225*** (0.020)	–0.142*** (0.026)	–0.291*** (0.025)
Poverty 1–2 years	–0.247*** (0.032)	–0.277*** (0.045)	–0.227*** (0.038)
Poverty 2–3 years	–0.218*** (0.040)	–0.172*** (0.058)	–0.252*** (0.049)
Poverty 3–4 years	–0.247*** (0.052)	–0.283*** (0.075)	–0.216*** (0.063)
Poverty 4–5 years	–0.271*** (0.063)	–0.208** (0.093)	–0.305*** (0.074)
Poverty over 5 years	–0.207*** (0.049)	–0.313*** (0.072)	–0.128** (0.058)
$R^2$	0.04	0.04	0.03
$N$	360,319	179,169	181,150

Robust standard errors in parentheses. All regressions include all of the nonpoverty controls in table 2. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

being in both cross-section and panel data. The results in table 2 show that this relationship also holds in low-income situations.

### B. Adaptation to Poverty

While individuals in poverty (according to the EU definition) report sharply lower levels of well-being than when they are not in poverty, table 2 does not tell us anything about the well-being time profile of those who enter poverty: well-being could go down and stay down, bounce back, or deteriorate with the duration of the poverty spell.

We investigate adaptation by splitting the currently poor into groups according to how long ago they entered poverty. We dice the  $d^0$  dummy from table 2 into six new dummy variables describing poverty of different durations: these indicate, for the currently poor, whether the individual entered poverty within the past year, one or two years ago, and so on, up to five or more years ago. If the individual adapts, then the estimated coefficients should become progressively smaller with duration, since having entered poverty longer ago has a more muted effect on life satisfaction than having become poor more recently.

The sample of the poor in our adaptation analysis is restricted to those for whom we observe the first entry into poverty while in the panel (otherwise, they are left-censored, and we do not know for how long they have been poor),<sup>7</sup> and it is only this first spell that is taken into consideration. This produces 8,115 first-observed poverty spells. Our regressions then compare the life satisfaction of the same individual before poverty to that reported during their first observed poverty spell. This is the same method that was applied to unemployment, marriage, divorce, widowhood, and children in SOEP data by Clark, Diener et al., (2008).

<sup>7</sup> Equally, if the individual is missing for one or more years during a poverty spell, all observations after the missed year(s) are dropped. This applies to only sixty individuals in our data.

FIGURE 1.—ADAPTATION TO POVERTY IN SOEP DATA

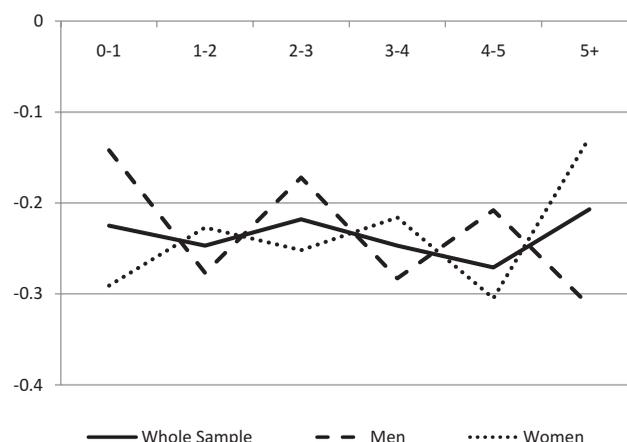


Table 3 shows the results of this analysis. The estimated coefficients there, which are also plotted in figure 1, show that poverty is associated with significantly lower well-being whatever its duration. The estimated coefficients on the different poverty-duration dummies are all significant and float around the  $-0.2$  to  $-0.3$  mark. We can test whether the estimated coefficients on poverty duration of greater than one year are different from that of 0 to one year in all three of table 3's regressions. There are only two significant differences for men: for durations of one to two years and three to four years, but in both cases, these estimated coefficients are more negative than that on poverty duration of up to one year.

There is a significant upturn after five or more years of poverty for women: poverty of five or more years' duration is still associated with lower life satisfaction for women, but with a smaller effect size. This partial uptick comes from women who are aged 60 or more on entering poverty and could be linked to widowhood (see section IIID). It is worth underlining that out of around 4,600 poverty entries for women of all ages in our data set, fewer than 300 last for five or more years.

In general, then, there is little evidence of adaptation to poverty here: poverty starts off bad and pretty much stays bad.<sup>8</sup>

### C. Adaptation and Poverty Intensity

Figure 1 suggests no adaptation to poverty. However, poverty as a state is arguably fundamentally different from the other life events that have so far been considered in the adaptation literature. An individual can be more or less poor, whereas this distinction does not really apply to

<sup>8</sup> The SOEP also contains information on four satisfaction domains: health, job, dwelling, and income. Poverty incidence and intensity are significantly negatively correlated with all four domain satisfactions. There is also no evidence of adaptation in any of the domains, with satisfaction with income, dwelling, and work satisfaction even appearing to drift down with the duration of the poverty spell.

unemployment or widowhood, for example. This matters here: figure 1 could reflect a composite of adaptation to the state of poverty ( $d^0$  above) combined with a rising intensity of poverty ( $d^1$ ) over time. To check, we introduce the contemporaneous intensity of poverty into table 3's regressions. As in table 2, the estimated coefficient on  $d^1$  is negative and significant. Crucially, its addition makes no difference to the estimated profile of well-being over time depicted in figure 1. Changing intensity is not masking adaptation.

#### D. The Causes of Poverty

The results that we have presented on (the lack of) adaptation to poverty are new in the literature. Or are they? It is fair to say that many movements into poverty happen for a reason. In addition, existing work on adaptation using subjective well-being data has emphasized one particular event to which there is little or no adaptation: unemployment. If most poverty entries are associated with job loss and the individual stays unemployed during the poverty spell, then we have arguably not added much new.

We investigate by identifying five broad categories of events that can happen to individuals at the time of their poverty entry: unemployment, loss of partner (via divorce, separation, or widowhood), retirement, disability,<sup>9</sup> and changing family size. These are picked up by identifying any changes in labor-force, marital, or disability status as well as household size between  $t - 1$  and  $t$ , when the individual also entered poverty between  $t - 1$  and  $t$ . None of these causes represent absorbing states, of course, and being divorced at the time of poverty entry does not mean that the individual remains divorced over the entire poverty spell.

Figure 2 summarizes the results. In the top-left panel, the adaptation profile of those who entered poverty through unemployment (under 10% percent of our poverty entries) does look different from that of those who did not. The former mostly have a greater drop in well-being (consistent with the estimated coefficient on unemployment in table 2) but then experience a rise in their life satisfaction back toward its initial level. This is likely due to the end of the unemployment spell (while the individuals in this graph remain poor, they do not necessarily remain unemployed). The literature has repeatedly noted that the lion's share of the subjective well-being effect of unemployment is nonpecuniary. Poverty entry via unemployment is actually associated with far more of a bounce-back in well-being than other types of poverty entry: no adaptation to poverty and no adaptation to unemployment are then far from being synonyms.

The figure at the top right shows a quite varied set of coefficients for those who enter poverty via retirement (4% of our poverty entries). The question of the health and well-being effects of retirement has led to a fairly ambivalent set

<sup>9</sup> Defined in the SOEP as a share of legally attested disability of over 30%.

of findings as to whether well-being consequently rises or falls (a recent example is Hetschko, Knabe, & Schöb, 2014). The middle-left panel does show a sharp bounce-back in life satisfaction for individuals whose poverty entry coincides with the loss of their partner (via widowhood, separation, or divorce: 3% of poverty entries). This mirrors the very marked movements in well-being following divorce and widowhood in the general SOEP population reported in Clark, Diener, et al. (2008).

The middle-right panel then considers entry into poverty via disability (5% of entries). There is quite a lot of variability in these estimates, with longer-duration poverty sometimes being estimated as worse than shorter-duration poverty and sometimes better. There is no evidence of a systematic rising trend over time, however.<sup>10</sup>

The bottom-left panel depicts poverty entry via a change in household size (which is germane, as our poverty measure relies on equivalent income). This is the largest identified cause of poverty entry, covering 25% of spells. An increase in the number of people in the household here most typically refers to more children. Equally, some poverty entry may be associated with family breakup (for single mothers, for example, although this would also appear in the loss-of-partner category above). There is a greater drop in satisfaction on entering poverty when this is associated with changing household size and no evidence of adaptation to poverty for this group.<sup>11</sup>

The bottom-right panel in figure 2 compares individuals who entered poverty at the same time as any of the five events to those who entered for other reasons. This turns out to split the sample by one-third to two-thirds. The weighted sum of the five other panels produces an adaptation profile that is overall pretty flat in both cases. Most of our causes of poverty entry apply to only a small percentage of respondents, and we have not identified any particular cause that is behind the lack of adaptation to poverty in general among SOEP respondents.

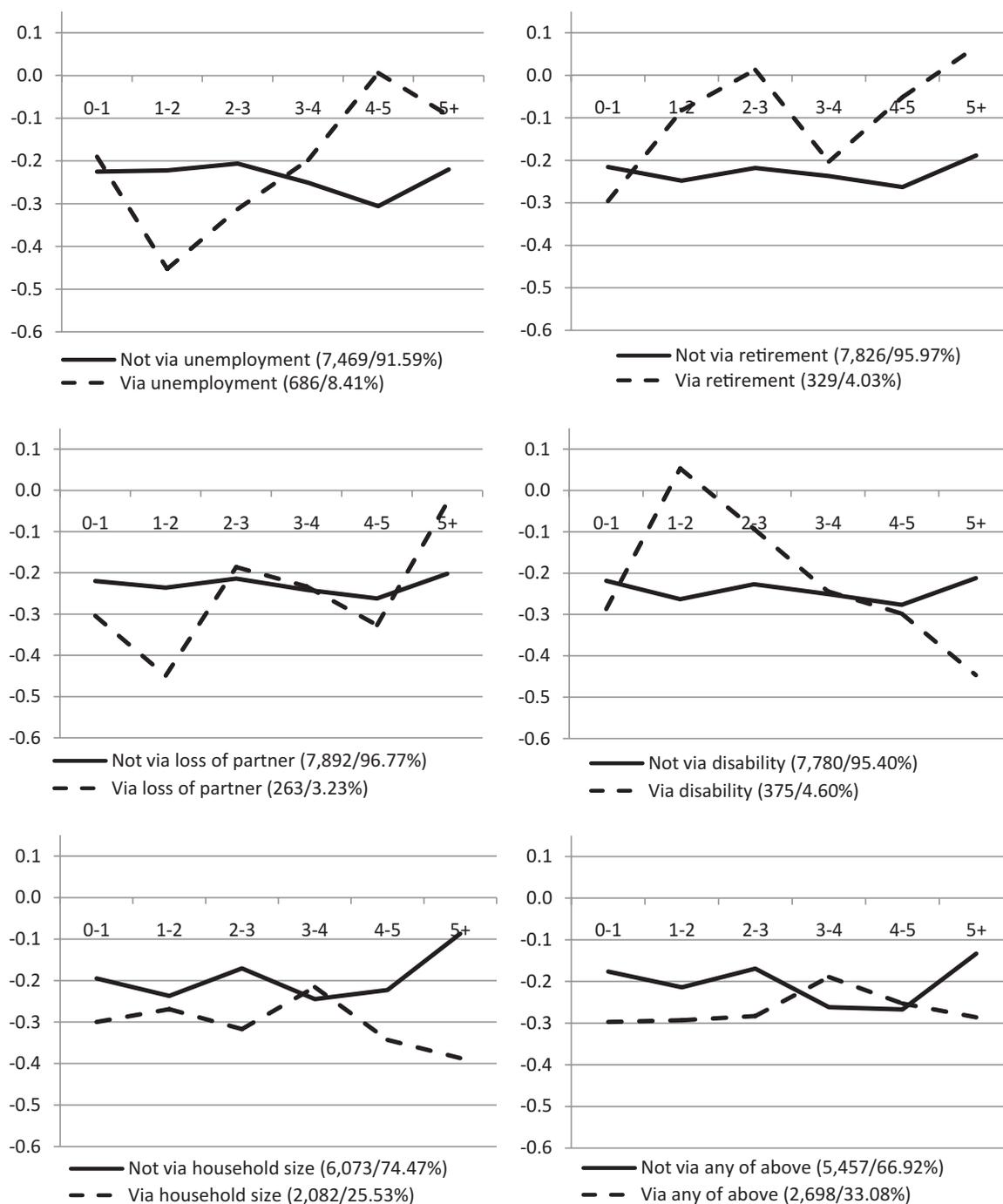
#### E. Which Poverty Line?

The analysis of poverty and well-being requires the definition of the former. We do not run into such problems with marriage or unemployment, for example. So far we have followed EU practice by taking a relative poverty line at 60% of the median of equivalent income per year. Although

<sup>10</sup> Disability in the SOEP is not absorbing: one-third of those who enter disability subsequently exit it at least once; of this latter group, around 60% re-enter disability at a later date.

<sup>11</sup> We can also split up our sample into increases and falls in household size. The adaptation pattern is slightly different in the two groups, with something of a partial bounce-back for increasing household size after five years of poverty but not for falls in household size. An alternative approach here is to run the regression in the first column of table 3 separately for different types of household. We did so for single parents, couples with children, couples without children, and those living alone. The only result of note here was some suggestion of partial adaptation by those living alone (many of whom are widows rather than unmarried; see section IIIB).

FIGURE 2.—ADAPTATION TO POVERTY, BY EVENTS CAUSING POVERTY



The two figures in parentheses refer to the number and percentage of poverty entries.

this is standard, we want to be sure that our results are not unduly dependent on this figure.<sup>12</sup>

The poverty line we used is unanchored. It changes from year to year due to movements in the distribution of house-

<sup>12</sup> The EU poverty line does seem to be reflected in the relationship between life satisfaction and income. We can plot the residuals from a regression of life satisfaction on a set of standard controls (not including income) on the percentiles of income (twenty sets of 5 percentile “ventiles”) by year. There is a notable kink in the resulting graphs, with the poverty line being either located exactly at this kink or close to it.

hold income. As such, individuals can enter poverty while experiencing a rise in nominal income, but also while enjoying higher real income (this depends on how income changes at the 60th percentile).<sup>13</sup> However, we would not typically think of poverty entry and higher real income as being synonymous.

<sup>13</sup> Although most entries into poverty are associated with sharp falls in income: the average drop in real income on entering poverty is over 40% in our sample.

TABLE 4.—ADAPTATION TO POVERTY AND DURATION OF THE POVERTY SPELL: FIXED-EFFECTS REGRESSIONS

	All	Spells of over Two Years Only	Spells of over Three Years Only	Spells of over Four Years Only
Poverty 0–1 years	–0.225*** (0.020)	–0.262*** (0.043)	–0.241*** (0.055)	–0.297*** (0.068)
Poverty 1–2 years	–0.247*** (0.032)	–0.299*** (0.043)	–0.244*** (0.054)	–0.322*** (0.064)
Poverty 2–3 years	–0.218*** (0.040)	–0.247*** (0.041)	–0.224*** (0.051)	–0.251*** (0.064)
Poverty 3–4 years	–0.247*** (0.052)	–0.291*** (0.053)	–0.279*** (0.054)	–0.351*** (0.066)
Poverty 4–5 Years	–0.271*** (0.063)	–0.327*** (0.063)	–0.316*** (0.064)	–0.341*** (0.065)
Poverty over 5 years	–0.207*** (0.049)	–0.268*** (0.051)	–0.258*** (0.052)	–0.283*** (0.053)
$R^2$	0.04	0.03	0.03	0.03
$N$	360,319	295,050	288,587	284,873

Robust standard errors in parentheses. All regressions include all of the nonpoverty controls in table 2. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

We can avoid this phenomenon by using an anchored poverty line. We take the distribution of income from the first wave of data for which annual income information was available for both the East and West German sample, 1992, to calculate a poverty line. This latter is then recalculated for all other years using movements in the CPI. Those who enter poverty must then have experienced a fall in real equivalent income. The use of this anchored poverty line in the analysis summarized in tables 2 and 3 makes practically no difference to our results.

Second, we can be concerned about measurement error in income. Some of those we record as entering poverty may not actually in fact have done so. One way to see whether this matters is to drop individuals whose income is just under the poverty line. This, of course, is equivalent to using a poverty line that is not 60% of median equivalent income, but a somewhat lower figure.

There are a number of different ways of addressing this issue, and we do not have much in the way of guidance. Any lower poverty line reduces the number of the poor, and there is some danger of ending up with small cell sizes (given our requirement that entry be observed and use of fixed effects). We dropped individuals who were within 5% of the poverty line (i.e., used a poverty line of 57% of the median). This had no impact on our qualitative results, and in particular we continue to find little evidence of adaptation.

Finally, poverty as defined here is a relative concept. But relative to whom? As is normal, we have so far used information on the national income distribution. An alternative is to calculate poverty lines at the state (*länder*) level. The equivalents of tables 2 and 3 here show poverty coefficients that are mildly larger in absolute terms but exhibit exactly the same qualitative characteristics.

#### F. Selection out of Poverty?

Our regressions include individual fixed effects. As such, they are not affected by worries that happier individuals are less likely to be poor or remain in poverty for shorter durations. The poverty coefficients in table 3 come from the com-

parison of the same individual with poverty of three to four years' duration and four to five years' duration, for example. This within-subject analysis is still affected by selection, however, as individuals who exit poverty within four years cannot be used for the above comparison. In general, while most of the poor can be used to calculate the coefficient on poverty of 0 to 1 year, those who are used for the calculation of longer-duration coefficients become increasingly selected.

The question then is, What would the adaptation profile of those who exit poverty earlier have looked like? By definition, we do not know. Resilient individuals might adapt to poverty, for example, and also have a better chance of recovering their health or finding a new (or better) job. In this case, the bias is against finding adaptation. Alternatively, those whose subjective well-being is falling more sharply might exit the survey altogether, producing a bias toward finding adaptation in this case.

Exit from poverty is not random in our data and is faster for the better educated, the elderly, and the youngest (results not reported). We can see whether the results are somehow dependent on people who leave poverty the earliest by progressively dropping shorter-duration poverty spells from our regression analysis. The results appear in table 4. The first column of this table reproduces the overall adaptation estimates using the whole sample from table 3. Column 2 then drops information on all completed poverty spells of two years or less. Columns 3 and 4 carry out an analogous procedure for spells of under four years and under five years.

Table 4 shows that shorter poverty spells are on average somewhat less harmful, in that the coefficients are a little more negative in columns 2 to 4 than in column 1. But they are remarkably similar in terms of the estimated shape: none of the columns reveal any evidence of adaptation. Selection out of poverty does not then seem to bias our conclusions.

#### G. Is Poverty Different from Any drop in Income?

We finally ask whether the well-being movements associated with poverty entry are different in nature from those

occurring around any fall in income.<sup>14</sup> We calculate income-drop spells as starting when nominal equivalent income falls between  $t$  and  $t + 1$ , with the spell continuing until time  $t + \tau$  when income weakly exceeds the predrop income at time  $t$ . We reestimate equations as in table 3, which include duration dummies for the income drop spells, plus an interaction for the income drop spell being a poverty spell.

The results (available on request) show that individuals report lower well-being consequent to any drop in income and do not seem to adapt during the income drop spell. However, we do identify an additional negative well-being effect from a poverty spell over and above that of experiencing an income drop.<sup>15</sup> Broadly speaking, a poverty spell is about twice as bad, in life satisfaction terms, as a nonpoverty income drop spell.

#### IV. Conclusion

We have used SOEP data to analyze the effects of poverty on individual well-being and show that both the incidence and intensity of poverty reduce life satisfaction. Our main results relate to adaptation. The negative effects of poverty are not ephemeral: there is overall little evidence that individuals adapt to poverty. This conclusion is not dependent on the definition of the poverty line, does not reflect the lack of adaptation to unemployment found in existing literature, and does not appear to be particularly biased by selection into poverty of different durations.

More work could usefully be done with respect to poverty adaptation. We first might wonder, as Di Tella et al. (2010) and Di Tella and MacCulloch (2010) ask with respect to adaptation to income, whether adaptation to poverty is the same across demographic groups. We found few sex differences in adaptation. It might also be the case that those from a low-income socioeconomic background react differently to poverty.<sup>16</sup> We did look at separate analyses by father's education, a proxy for socioeconomic background, but found consistent results across the three classes of father's education. Other analyses, by personality type or birth cohort, for example, may well produce sharper differences. A second question addresses anticipation effects on well-being before poverty entry. If there is indeed anticipation, then the well-being impact of poverty after entry will be underestimated in absolute terms (we will be using an intercept that is too low). However, this should have no implications for the shape of the adaptation profile after poverty entry.

<sup>14</sup> We expect these "income drop" spells to produce lower subjective well-being because they are associated with lower income and because individuals dislike losses per se. See Boyce et al. (2013) for evidence from the SOEP in this respect.

<sup>15</sup> Were we to put a placebo poverty line at any percentage level of median income, we would always find a fall in life satisfaction and little evidence of adaptation. But the drop in satisfaction is far larger when we use one of the common definitions of income poverty.

<sup>16</sup> Thanks to an anonymous referee for this point.

Whether we believe that movements in subjective well-being over time reflect real phenomena or not, the key message from this paper is that individuals at the bottom of the income distribution do not say that they have adapted to their situation. The candidate happy slaves in the SOEP turn out to be not so happy after all.

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