

# The impact of economic insecurity on life satisfaction among German citizens

Demetrio Panarello, Gennaro Punzo

## 1. Introduction

The concept of life satisfaction dates back to the Age of Enlightenment and became popular in the Nineteenth century as a synonym for ‘good life’. Understood as an overall assessment of the life a person leads (Veenhoven, 2017), since the 1960s there have been attempts to go beyond traditional economic criteria by broadening the definition and measurement of both the concept of well-being and life satisfaction on the basis of a wide range of indicators (Hasan, 2019; Hall et al., 2010). Although ‘money cannot buy happiness’, the economic dimension remains a crucial element in the assessment of many issues such as poverty, inequality, and deprivation (D’Ambrosio and Rohde, 2014). In particular, economic insecurity may also play a central role in assessing the well-being and life satisfaction of individuals and, by extension, of their family members, with inevitable repercussions for future generations (Linz and Semykina, 2010).

Economic insecurity has attracted the attention of researchers as a key aspect of socio-economic behaviour. It originates from unexpected economic loss (Giambona et al., 2022) due to feelings of failure and inability to recover and can be broadly defined as the sense of stress associated with an uncertain financial future (Panarello, 2021). Among other things, researchers observed associations between economic insecurity and political support (e.g. Colantone and Stanig, 2018; Guiso et al., 2017), body weight (Smith et al., 2013), mental health (Rohde et al., 2016), and environmental concern (Panarello, 2021). Therefore, there is reason to believe that economic insecurity can greatly affect individuals’ behaviour, as well as their well-being and satisfaction with life.

Based on the above, this paper analyses the impact of economic insecurity on workers’ life satisfaction over time in Germany. In particular, economic insecurity is investigated for its impact on the trajectories of life satisfaction over a time span of 29 years among working-age German citizens, taking into account their age and sector of economic activity.

The present article is structured as follows. Section 2 introduces the economic insecurity index and the growth models, which represent the key methodological ingredients of the study. Then, Section 3 illustrates the data, while Section 4 presents the main findings and closes with a brief summing-up.

## 2. Method

### 2.1 Economic insecurity index

Economic insecurity depends on the current level of income that each individual earns and its past changes, considering both the reserve role it may play in the event of future adverse events and the subjective prediction of how well the individual will handle possible future losses (D’Ambrosio and Rohde, 2014). In our analysis, we use the Bossert and D’Ambrosio’s (2016) economic insecurity index. This is an individual-level objective measure that considers income fluctuations between various consecutive years. Income gains and losses are assigned different weights, as well as more recent periods compared to those farther in the past, assuming that losses are more relevant than gains for the development of insecurity and that closer periods are more important than the remoter ones. The index can be defined as:

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$$I^T(x) = l_0 \sum_{\substack{t \in \{1, \dots, T\}: \\ x_t > x_{t-1}}} \delta^{t-1}(x_t - x_{t-1}) + g_0 \sum_{\substack{t \in \{1, \dots, T\}: \\ x_t < x_{t-1}}} \delta^{t-1}(x_t - x_{t-1})$$

where  $x = (x_T, \dots, x_0)$  is an individual's yearly income;  $t$  is the distance from the current period, so that 0 refers to the current year and 2, for instance, refers to two years before;  $l_0$  and  $g_0$  are the weights assigned to past income losses and gains, respectively, and  $\delta$  is the weight based on the distance from the current period. We use  $l_0 = 1$ ,  $g_0 = 0.9375$  and  $\delta = 0.9$  for five years of income as in Bossert et al. (2019). Then, to run the models, the index is standardised with mean of zero and standard deviation of one.

## 2.2 Growth models

Latent Growth Curve Models (LGCs) were fitted to analyse over-time changes in workers' life satisfaction in relation to their economic insecurity. LGCs involve fitting a trajectory through each individual's repeated measures of life satisfaction to summarise its changes over the period 1989-2017 ( $T=29$ ).

To consider variation between individuals in the rate of change in life satisfaction (outcome variable) and its level at any time, a random slope growth model was fitted:

$$y_{ij} = \beta_0 + \beta_1 x_{ij} + u_{0j} + u_{1j} x_{ij} + e_{ij}$$

where  $y_{ij}$  is the outcome variable at time  $i$  ( $i = 1, \dots, T$ ) for individual  $j$  ( $j = 1, \dots, n$ );  $x_{ij}$  is the economic insecurity evaluated at time  $i$  on individual  $j$ ;  $\beta_0$  is the intercept;  $\beta_1$  is the overall average slope;  $u_{0j}$  and  $u_{1j}$  are two individual-level random effects; and  $e_{ij}$  is an occasion-specific residual, detecting the effects on  $y$  of unobserved time-varying characteristics.

The growth rate for individual  $j$  is given by the sum of the overall average slope  $\beta_1$ , which is common to all individuals, and a random amount  $u_{1j}$  specific to individual  $j$ . It is assumed that  $u_{0j}$  and  $u_{1j}$  follow a bivariate normal distribution with zero mean:

$$\begin{pmatrix} u_{0j} \\ u_{1j} \end{pmatrix} \sim N(0, \Omega_u) \quad \text{where } \Omega_u = \begin{pmatrix} \sigma_{u_0}^2 & \\ & \sigma_{u_1}^2 \\ \sigma_{u_{01}} & & \sigma_{u_1}^2 \end{pmatrix}$$

$\sigma_{u_0}^2$  is the between-individual variance in the intercept;  $\sigma_{u_1}^2$  is the between-individual variance in the slope of  $x_{ij}$ ;  $\sigma_{u_{01}}$  is the covariance between individuals' intercepts and slopes.

The random slope growth model captures the within-individual correlation structure, relaxing the assumption of equal covariance between any pair of measurement occasions of the random intercept model. The correlation between responses is assumed to depend on the timing of each response and is expected to decrease as the time lag between observations increases. The random slope model allows the decomposition of the impact of economic insecurity on life satisfaction into a fixed component (the same for all individuals) and an individual-specific random component.

## 3. Data

LGCs were estimated on longitudinal data from the German Socio-Economic Panel (SOEP). Established in 1984, the SOEP has been running for almost 40 years. About 15,000 households and 30,000 individuals are currently part of the SOEP survey. The SOEP collects information from a representative sample of the German residential population aged 17 years and older, by means of questions of both objective (socio-demographic) and subjective (satisfaction, perceptions, attitudes, concerns) nature.

In this analysis, we consider a panel dataset of individuals aged from 16 to 64. The outcome variable is the current level of satisfaction with life, self-reported by respondents every year on a Likert scale going from 1 (low) to 10 (high).

All available waves until 2017 were used to build the dataset. We dropped the initial sample, interviewed in 1984. Then, as the economic insecurity index is computed over a five-year time span, we calculated the first value of the index for 1989, based on data from 1985-1989. Therefore, we finally consider complete data for twenty-nine SOEP waves (1989-2017).

Considering the observations with available data on economic insecurity and life satisfaction, we perform our analysis on a dataset of 195,004 observations from a sample of 31,496 individuals over a time span of 29 years.

Life satisfaction for the full estimation sample is shown in Table 1. Among the observations collected over time, about two thirds fall between the sixth and the eighth level on the life satisfaction scale, while the rest is equally distributed between levels 1 to 5 (16%) and 9 to 10 (16%).

**Table 1 Distribution of life satisfaction over the considered sample (195,004 observations, 31,496 individuals, 29 years)**

Current Life Satisfaction	Frequency	Percent	Cumulative
Level 1	502	0.26	0.26
Level 2	1,650	0.85	1.10
Level 3	3,951	2.03	3.13
Level 4	5,784	2.97	6.10
Level 5	18,708	9.59	15.69
Level 6	21,125	10.83	26.52
Level 7	47,158	24.18	50.71
Level 8	64,884	33.27	83.98
Level 9	24,211	12.42	96.39
Level 10	7,031	3.61	100.00
Total	195,004	100.00	

#### 4. Results and conclusions

Economic insecurity was investigated to assess its impact on life satisfaction trajectories over a 29-year time span among working-age German citizens, grouped by activity sector (secondary vs. tertiary) and age (16-29, 30-39, 40-49, 50-64).

**Table 2 Random slope model estimates – Secondary sector by age**

Parameter	16-29	30-39	40-49	50-64
	Estimate (Std. Err.)	Estimate (Std. Err.)	Estimate (Std. Err.)	Estimate (Std. Err.)
Intercept ( $b_0$ )	7.3477*** (.0204)	7.2048*** (.0200)	7.0737*** (.0197)	7.0148*** (.0218)
Average slope ( $b_1$ )	-0.0633*** (.0196)	-0.0815*** (.0191)	-0.1310*** (.0192)	-0.0898*** (.0118)
Between-individual intercept variance ( $\sigma_{u0}^2$ )	1.0142 (.0379)	1.2111 (.0366)	1.4221 (.0386)	1.5161 (.0438)
Between-individual slope variance ( $\sigma_{u1}^2$ )	0.0407 (.0183)	0.0496 (.0196)	0.0812 (.0243)	0.0047 (.0041)
Between-individual intercept-slope covariance ( $\sigma_{u01}$ )	-0.0092 (.0232)	0.0842 (.0232)	1.1015 (.0252)	0.0601 (.0159)
Within-individual variance ( $\sigma_e^2$ )	1.3864 (.0229)	1.1127 (.0153)	1.1438 (.0142)	1.2200 (.0146)
<i>Observations</i>	<i>11921</i>	<i>15761</i>	<i>19367</i>	<i>18329</i>
<i>Groups</i>	<i>4024</i>	<i>4196</i>	<i>4850</i>	<i>4129</i>
<i>Log-likelihood</i>	<i>-21002.92</i>	<i>-26328.45</i>	<i>-32781.11</i>	<i>-31277.19</i>

Note: \*\*\* stands for  $p$ -value < 0.01.

**Table 3 Random slope model estimates – Tertiary sector by age**

Parameter	Age 16-29	Age 30-39	Age 40-49	Age 50-64
	Estimate (Std. Err.)	Estimate (Std. Err.)	Estimate (Std. Err.)	Estimate (Std. Err.)
Intercept ( $b_0$ )	7.3259*** (.0153)	7.2362*** (.0144)	7.1194*** (.0144)	7.0847*** (.0155)
Average slope ( $b_1$ )	-0.0313*** (.0095)	-0.0796*** (.0110)	-0.0956*** (.0090)	-0.0607*** (.0080)
Between-individual intercept variance ( $\sigma_{u_0}^2$ )	1.0760 (.0287)	1.1828 (.0266)	1.5228 (.0287)	1.6021 (.0312)
Between-individual slope variance ( $\sigma_{u_1}^2$ )	0.0004 (.0001)	0.0226 (.0076)	0.0148 (.0062)	0.0171 (.0055)
Between-individual intercept-slope covariance ( $\sigma_{u_01}$ )	0.0204 (.0011)	0.0812 (.0141)	0.0864 (.0127)	0.0630 (.0114)
Within-individual variance ( $\sigma_e^2$ )	1.3316 (.0155)	1.1621 (.0115)	1.1330 (.0097)	1.1501 (.0097)
<i>Observations</i>	22202	29375	38517	39532
<i>Groups</i>	7327	7965	9509	8476
<i>Log-likelihood</i>	-38752.09	-49540.71	-65084.15	-66590.55

Note: \*\*\* stands for  $p$ -value < 0.01.

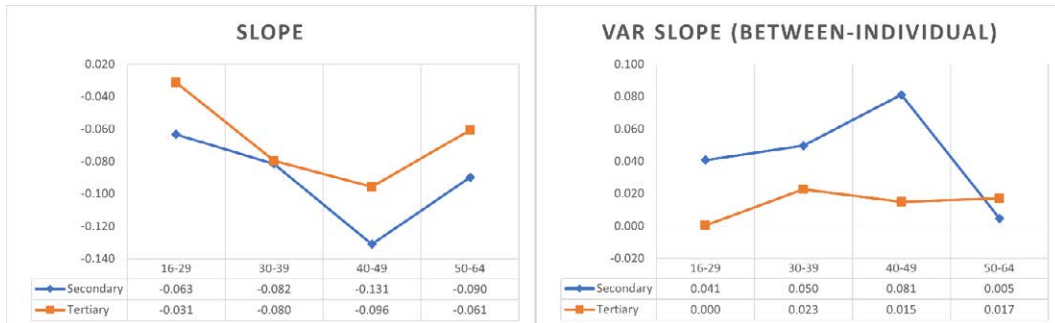
The results of our models are presented in Table 2 (for the secondary sector) and Table 3 (for the tertiary sector).

Random slope growth models allow us to adequately capture individual variation in over-time trajectories. As, in our case, the average slopes are negative ( $\beta_1 < 0$ ), the positive intercept-slope covariance ( $\sigma_{u_01} > 0$ ) shows that individuals with above-average intercepts ( $u_{0j} > 0$ ) tend to have flatter-than-average slopes ( $u_{1j} < 0$ ). Similarly, individuals with below-average intercepts ( $u_{0j} < 0$ ) tend to have steeper-than-average slopes ( $u_{1j} > 0$ ).

We describe the four main components of the random slope models graphically in Figs. 1-4. Each graph shows, separately for the two activity sectors, the values for the four age groups. The blue line depicts the secondary sector, while the orange line represents the tertiary sector; the four points on the x-axis represent the age groups (16-29; 30-39; 40-49; 50-64).

Figure 1 (left side) shows the average slopes. For each group of workers, there is a significant negative relationship between economic insecurity and life satisfaction; that is, a higher level of economic insecurity leads people to a lower level of life satisfaction, regardless of age and activity sector. In particular, for workers in both activity sectors, the negative impact of economic insecurity on life satisfaction is stronger for mid-career workers (40-49 age group) and less relevant for younger workers (16-29). The negative impact of economic insecurity on life satisfaction is consistently stronger for workers in the secondary sector than for those in the tertiary sector, except for workers in the 30-39 age group, for whom this impact is not significantly different between the two sectors.

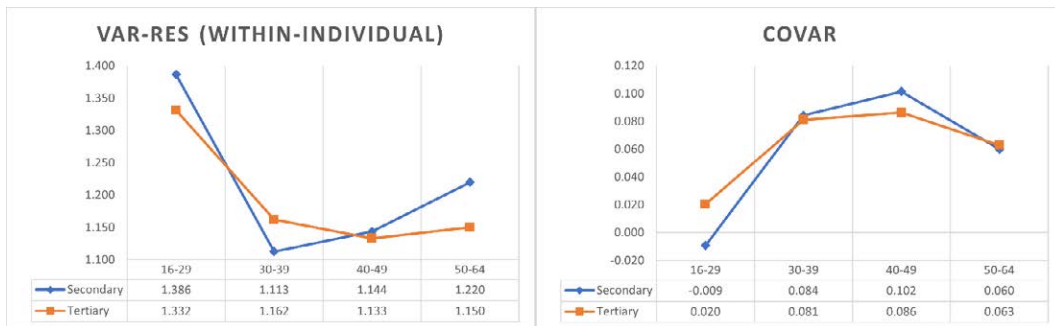
Figure 1 (right side) shows the between-individual slope variance, estimated individually for each worker in the sample, which illustrates the variability of the random component of the growth rate. The between-individual slope variance is higher in the secondary sector for the first three age groups, while it is higher in the tertiary sector for workers aged 50 and over. With reference to the 40-49 age group, the differences between workers in the two sectors, which already appeared quite large when considering the fixed component of the model, appear even larger when also considering the random component.



**Figure 1 Average slope (left) and between-individual slope variance (right), by activity sector and age group**

Figure 2 (left side) shows that the within-individual variance does not show large differences between workers in the two sectors. Greater variability is observed for the youngest class of workers (16-29). Therefore, within this age group, the impact of economic insecurity on life satisfaction has a greater variability over time; that is, economic insecurity affects young workers' life satisfaction in a more volatile way, meaning that the perception on satisfaction with life is less stable over time at young ages.

The between-individual intercept-slope covariance (Figure 2, right side) is generally positive and increasing up to the 40-49 age group. This means that workers who show an above-average level of life satisfaction at baseline also tend to show a below-average decline in their level of life satisfaction over time. By contrast, workers with a below-average level of life satisfaction at baseline tend to show an above-average decline in their level of life satisfaction. This trend is particularly relevant for mid-career workers (age group 40-49), especially for those employed in the secondary sector. For the age groups 30-39 and 50-64, there are no significant differences between workers in the two activity sectors.



**Figure 2 Within-individual variance (left) and between-individual intercept-slope covariance (right), by activity sector and age group**

In brief, the results show that economic insecurity has a consistent negative impact on life satisfaction, especially for mid-career people and for employees in the secondary sector. The higher within-individual over-time variability shows that economic insecurity affects life satisfaction more unpredictably for the youngest workers. These and other relevant differences between the considered groups give room for the implementation of policy measures aimed at reducing economic insecurity with a view to enhance individuals' satisfaction with life, specifically targeted on the different life stages and activity sectors.

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