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# The well-being age U-shape effect in Germany is *not* flat

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### Abstract

Kassenboehmer and DeNew (2012) claim that there is no well-being age U-shape effect for Germany, when controlling for fixed effects and respondent experience and interviewer characteristics in the German Socio-Economic Panel, 1994-2006. We re-estimate with a longer run of years and restrict the age of respondents to those under seventy and find the well-being age U-shape effect is neither flat nor trivial.

JEL Codes: I31; J14; C42.

Word Count: 1951

Key words: age; ageing; life satisfaction; interviewer characteristics; interviewee experience; fixed effects; panel analysis; GSOEP

This paper updates work by Kassenboehmer and De-New (2012) – henceforth KD.<sup>1</sup> In response to claims made in Blanchflower and Oswald (2009) the authors’ central claim using the German Socio-Economic Panel (GSOEP), 1994-2006 is *“the otherwise seemingly robust age U-shape effect on life satisfaction in pooled OLS regressions is refuted with the German SOEP when controlling for panel fixed effects and respondent experience in the panel”*.<sup>2</sup>

We replicate these results for their time period but show they do not apply to earlier or later time periods or the full sample from 1984-2018. Our main arguments are as follows

- 1) The data KD use for 1994-2006 is special. Data for earlier period (1984-1993) and for a later period (2007-2018) and for the longest time run of years from 1984-2018, with three times as many observations is not supportive of their conclusions that there is no U-shape.
- 2) KD include individuals age 70 and above. Hudomiet et al. (2021) and Nemitz (2021) have shown this results in a mortality selection bias problem. The problem arises because happy individuals live longer. Studies that include those over the age of seventy end up having to include higher order terms in age (Wunder et al, 2013). Once the mortality selection bias is accounted for happiness and well-being tends to fall, due to death of a spouse and ill-health in the final years of life.
- 3) We argue that it is inappropriate to include years in panel and its square as controls, but still find when we do that there is a significant U-shape in our 1984-2018 sample.

In all of our equations reported below we include as close as we can approximate the same list of control variables that HD did whether one is currently unemployed, out of the labor force, entering into unemployment (differentiated between reasons — fired, company closure or other voluntary reasons), entering out of the labor force or entering into employment. They also control for what they call ‘severe shock’ variables (separation, divorce, death of spouse, children born), health indicators, real household net income and household composition. KD also add interviewer experience and gender as controls which have little or no impact on the found U-shape. What turns out to be crucial is the years in panel variable and its square which is our main focus here. We believe it has been wrongly included.

A number of subsequent studies published since 2012 have also used the GSOEP panel data for Germany to find U-shapes. Wunder et al. (2013), found an age minimum at age 52. Bartolini, Bilancini & Sarracino (2013), used GSOEP data from 1996-2007 and found a U-shape for those under 65. Ferrer-i-Carbonell and Frijters (2004) used the GSOEP for West Germans and found U-shapes in age with both OLS and with fixed effects. Baetschmann (2013); Mertens & Beblo (2016) and Obućina (2013), also found U-shapes in the GSOEP data. Piper (2021) found that temporary employment deepens the U-shape in midlife in comparison to that found for those in permanent employment. Cheng et al. (2017) found a U-shape using a new method using the GSOEP from 1984-2008.<sup>3</sup>

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<sup>1</sup> John Haisken-DeNew has changed his name to John DeNew.

<sup>2</sup> KD present five separate OLS regressions using OLS **all** of which find U-shapes.

<sup>3</sup> We re-estimated using the Cheng et al (2017) method but the results were sensitive to the inclusion of controls.

## Results

We extend the GSOEP data series from 1984 through 2018 and due to concerns of mortality selection bias, we restrict the data to the age range 18-69. This results in an overall sample size of 472,869 and 403,041 for the fixed effect estimation where individuals have to be in at least two sweeps, that is have dropped out of the GSOEP and returned, with the relevant variables, versus 149,190 and 116,876 respectively in KD. This long-run of data is not supportive of KD's claims that appear to result from small sample bias.

In what follows in [Tables 1-4](#) we report four sets of time estimates, first for the years 1984-1993, then for the KD years, of 1994-2006 then 2007-2018 and finally for the entire period 1984-2018. We everywhere find U-shapes in age using OLS for each of the four time periods as KD did, as shown in our [Table 1](#). We solve for a minimum which shows some evidence of increasing over time, from 42 in the first period to 45 in the second and 50 in the latest period, and 46 overall.<sup>4</sup>

In [Figure 1](#) we simply plot the single year of age coefficients from two life satisfaction equations for 1984-2018 without controls but which also includes wave dummies (n=581,510). We then repeat for 'with controls' with the full set of controls including interviewer years of experience and gender variables for the sample of individuals who had interviewers (n=403,041). The functions both minimize around age fifty. So, the U-shape is not being forced on the data via the quadratic.

**Conclusion #1. Using OLS there are U-shapes in life satisfaction that minimize between age forty-two and fifty in all time periods, with some evidence the minimum has risen over time. This is consistent with what KD found.**

The crucial set of results are those using fixed effects as reported in [Table 2](#) for the three time periods and then for 1984-2018. There are U-shapes in age once again here in the first and third period and overall, with minima of 58, 40 and 58 respectively. What stands out though, is even though the coefficient on the age term is significant and negative and that on the squared term as significant and positive, the minimum is at age 100, outside the range of our data for KD's sample years.

**Conclusion #2. The GSOEP data from the years 1994-2006 period examined by KD is special and not representative of the sample as a whole, or the earlier or later years.**

In [Table 3](#) we replicate KD's results in column 5 of their Table 2 by reporting fixed effect results only for those approximately 20% of individuals who had no interviewer. KD included years in panel and its square and did not find a significant U-shape although the age coefficient was insignificantly negative (-.0288, t=0.7) and the age squared coefficient was significant and positive (.00009, t=4). We repeated this exercise first in part a) without the years in panel variables and

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<sup>4</sup> Blanchflower (2021) found for Germany using life satisfaction for those under age 70. Minima were for West Germany from Eurobarometers, 2009-2019 were 45 without controls and 44 with; and from the Mannheim Eurobarometer files for 1973-2002 39 with controls so there was some evidence of a rise in the minimum there. Other minima were found of 49 using the European Social Surveys, 2002-2016, 43 using the European Quality of Life Survey without controls and 49 with them as well as 48 with controls from the 2017 ISSP and 43 in Wave #3 (1995-8), 51 in Wave #5 (2005-9) and 56 in Wave #6 (2010-14) of the World Values Survey all with controls.

there were U-shapes in all four periods with the bottom being at 49 years old for the overall sample. In part b) we included the two years in panel variables and there is in fact a U-shape in the middle period although it minimizes at age 61. The total sample result in column 4 gives a clear U-shape with a minimum at 40 for those with no interviewer. We now move on to look at those who had interviews who KD examined in their Table 3.

In our [Table 4](#) we restrict the sample to those who had an interviewer and included both years of experience and the interviewer's gender as controls as HD did. They found significant U-shapes as noted above in columns 3 and 4 using OLS as noted above but found the age coefficient to be insignificant and positive in both cases while only the age squared term was significant and positive in column 2 when the years in survey squared variable was omitted. We broadly replicate their result in column 2 for each of the three time periods: there is an insignificant age coefficient in columns 1 and 3 and the minimum is around 200 in column 2. But column 4 is different we find well defined U-shape in age with a minimum at age 42. We would argue against the inclusion of these years in panel variables but crucially here even when we do include them (we find a U-shape in the long sample).

Given that years in panel is largely a linear transformation of age, a fixed effects estimation cannot obtain precisely estimated coefficients for both variables. Indeed, and as expected, an FE estimation with age and years in the panel on the right-hand side in Stata omits years in panel because of collinearity for those with one spell in the GSOEP. Independent variation facilitating the calculation of coefficients for age rests on the 7% of individuals who have had more than one spell in the panel. This is a massive loss of sample size and helps to explain why KD find insignificant age coefficients which leads to their claim that well-being is flat in age.

***Conclusion #3. The robust age U-shape effect on life satisfaction in pooled OLS regressions is confirmed with the German SOEP when controlling for panel fixed effects and respondent experience in the panel.***

Additionally, the U-shape does not disappear when interviewer effects - a key part of KD's analysis (2012) - are considered. Our results show that interviewer effects barely affect the U-shape, and the interviewer gender (one of KD's considerations) is consistently insignificant in a fixed effects context. This lack of variation in the gender of the interviewer an individual has over the years is similar to our arguments regarding the lack of sufficient variation when taking into account a respondent's time in the survey by years-in-panel variables.

## **Discussion**

It also does not seem that the decline in well-being from youth to midlife as Galambos et al. (2021, 2020) among others have claimed is trivial (Blanchflower and Graham, 2021a). The decline in the age means is about 0.73 life satisfaction points from young to the minimum of the function, pooled across the years 1984-2018. This is more than the difference between being married and divorced (0.58), about the difference between married and separated (0.72) and about 60% of the difference between working and unemployment (1.25). The drop is almost as large as the difference in average life satisfaction between those who have trouble walking up stairs and those who don't (0.85); and comfortably more than for the difference between those who stayed

overnight in a hospital in the last year and for those who didn't (0.49) and approximately double between those who have high blood pressure and those who don't (0.36). Non-trivial.

*Prima facie*, the KD (2012) challenge to the U-shape could indicate to the casual reader that the U-shape found in cross-section studies disappears when individual fixed effects are controlled for.<sup>5</sup> As we have shown, this is not the case. That the U-shape holds when fixed effects estimation is used indicates that this is a lifecycle, or ageing effect, something that people, on average, go through, while not ruling out cohort effects.<sup>6</sup>

**Conclusion #4. The relationship between age and well-being in Germany, whether estimated with OLS or panels, and whether it includes years in panel and interviewer variables is U-shaped in age using the GSOEP over the period 1984-2018. It is clearly neither flat nor trivial.**

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<sup>5</sup> Blanchflower and Graham (2021a; 2021b) counter claims that there are no U-shapes and report more than 400 published papers that find them.

<sup>6</sup> Clark (2019) reached a similar conclusion with British panel data.

Table 1. OLS life satisfaction equation with controls, age<70

	1984-1993	1994-2006	2007-2018	1984-2018
Age	-.0907 (22.41)	-.1278 (46.56)	-.1101 (45.46)	-.1006 (61.70)
Age <sup>2</sup> *100	.1087 (22.31)	.1419 (44.69)	.1112 (40.41)	.1104 (58.50)
Adjusted R <sup>2</sup>	.0767	.0967	.0730	.0763
N	92,203	177,958	208,708	472,869
Minimum	42	45	50	46

Controls are labor force and marital status, log real household income, years of education, number of children and region. T-statistics in parentheses.

Table 2. Fixed effects life satisfaction equation with controls, age<70

	1984-1993	1994-2006	2007-2018	1984-2018
Age	-.0572 (5.35)	-.0676 (12.82)	-.0617 (11.05)	-.0605 (25.30)
Age <sup>2</sup> *100	.0491 (4.21)	.0340 (5.69)	.0775 (13.09)	.0519 (19.52)
Overall R <sup>2</sup>	.0356	.0290	.0325	.0538
N	71,448	154,925	176,668	403,041
Minimum	58	100	40	58

Controls as in Table 1.

Table 3. Fixed Effects life satisfaction for those with no interviewer, age<70

a) Without years in panel variables				
	1984-1993	1994-2006	2007-2018	1984-2018
Age	-.1312 (2.82)	-.1268 (7.99)	-.0639 (4.32)	-.0999 (13.68)
Age <sup>2</sup> *100	.1672 (2.96)	.1029 (5.56)	.0768(4.91)	.1023 (12.49)
Overall R <sup>2</sup>	.0386	.0371	.0325	.0597
N	5,615	21,995	30,112	57,622
Minimum	39	62	42	49
b) With years in panel variables				
	1984-1993	1994-2006	2007-2018	1984-2018
Age	-.0755 (0.60)	-.1198 (2.51)	-.0078 (0.19)	-.0767 (3.33)
Age <sup>2</sup> *100	.1787 (3.14)	.0956 (5.05)	.0717(4.53)	.0949 (11.42)
Years in panel	.0075 (0.05)	.0261 (0.64)	-.0778 (1.89)	-.0406 (1.74)
(Years in panel) <sup>2</sup>	-.0061 (9.28)	.0011 (9.85)	.0007 (3.81)	.0008 (6.59)
Overall R <sup>2</sup>	.0386	.0430	.0002	.0597
N	5,615	21,995	30,112	57,622
Minimum	n/a	63	n/a	40

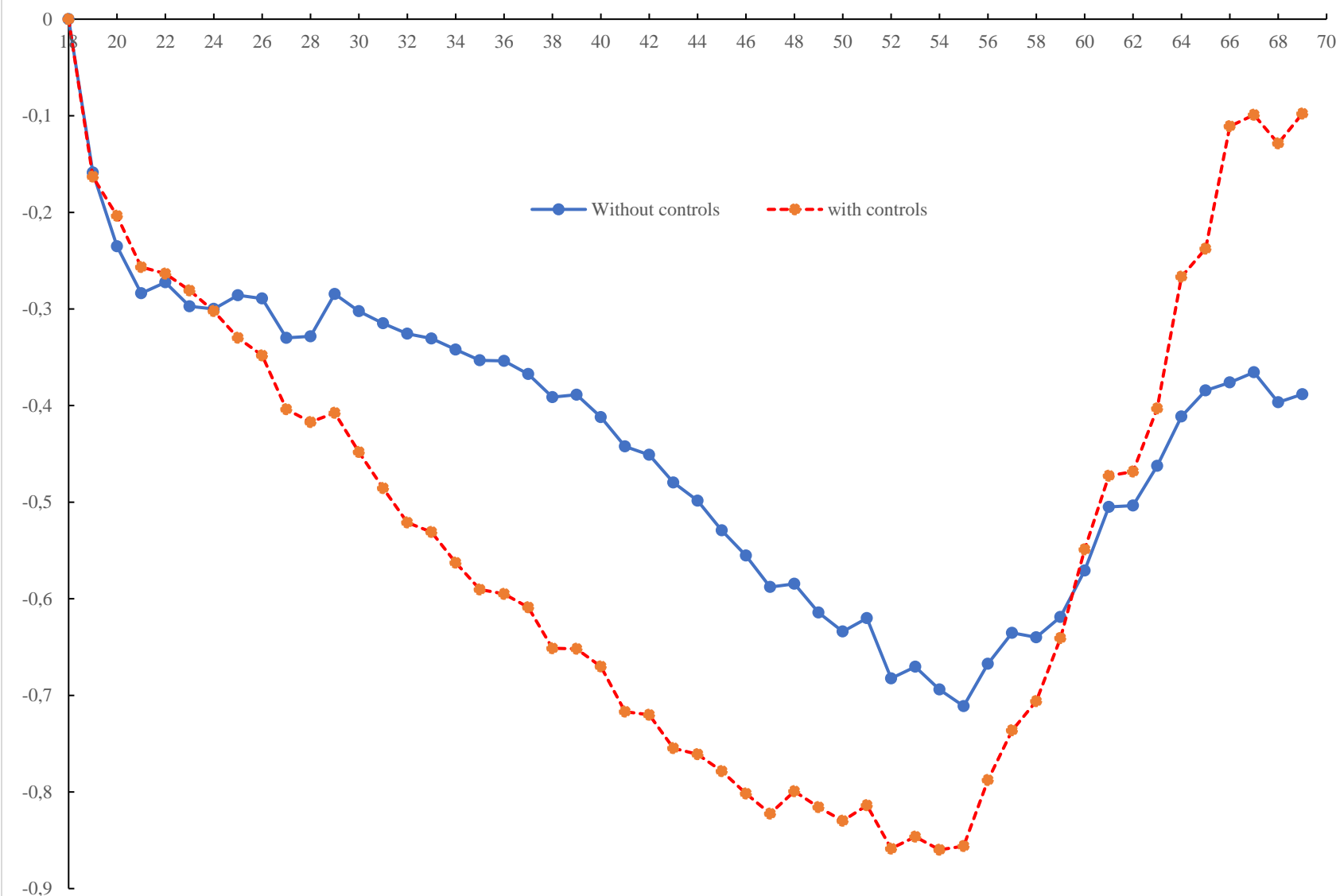


Table 4. Fixed Effects life satisfaction for those with an interviewer, age<70

	1984-1993	1994-2006	2007-2018	1984-2018
Age	-.0265 (0.36)	-.1169 (2.87)	-.0356 (1.67)	-.0417 (3.17)
Age <sup>2</sup> *100	.0448 (3.83)	.0296 (4.94)	.0690 (11.50)	.0504 (18.92)
Interviewer experience	.0057 (1.16)	-.0045 (3.71)	-.0038 (4.83)	-.0040 (6.89)
Interviewer male	.0451 (1.91)	-.0247 (1.66)	-.0234 (1.74)	-.0076 (0.96)
Years in panel	-.1323 (1.78)	.0261 (0.64)	-.0378 (1.76)	-.0388 (2.94)
(Years in panel) <sup>2</sup>	.0088 (9.28)	.0011 (9.85)	.0007 (10.22)	.0008 (19.28)
N	71,448	154,925	176,668	403,041
Overall R <sup>2</sup>	0.0277	.0071	.0140	.0614
Minimum	n/a	198	26	42

Controls as in Table 1. T-statistics in parentheses.

Chart 1. U-shape in Life Satisfaction, GSOEP, 1984-2018



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