


How Satisfied are the Self-Employed? A Life Domain View

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Abstract It is well-known in the literature that self-employment positively influences job satisfaction, but the effects on other life domains and overall life satisfaction are much less clear. Our study analyzes the welfare effects of self-employment apart from its monetary aspects, and focuses on the overall life satisfaction as well as different domain satisfactions of self-employed individuals in our German sample from 1997 to 2010. Using matching estimators to create an appropriate control group and differentiating between different types of self-employment, we find that voluntary self-employment brings with it positive benefits apart from work satisfaction, and leads to higher overall life satisfaction as well as increased health satisfaction, all of which increase in the first three years of self-employment. Being forced into self-employment to escape unemployment, however, confers no such benefits. Additionally, both types of self-employment lead to increasing dissatisfaction with one's leisure time.

Keywords Subjective well-being · Self-employment · Domain satisfaction · Matching estimators · SOEP

JEL Classification L26 · J24 · J28

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1 Introduction

With society undergoing rapid change in its forms of work organization, entrepreneurs and the self-employed have come to the attention of researchers. Small, high-growth firms are one important driver for employment growth (Henrekson and Johansson 2010) and policy-makers are interested in fostering a more entrepreneurial society (Storey 1994). But what about entrepreneurs and the self-employed themselves? There is much research interest in which factors make for a successful entrepreneur (Sarasvathy 2004), but we are also interested in what the outcomes of successful entrepreneurship are: despite the self-employed usually earning less than their employed counterparts (Hamilton 2000), large numbers of individuals find becoming their own boss highly attractive (Blanchflower 2004). One common explanation for this is the high degree of autonomy and work satisfaction individuals can derive from self-employment (Benz and Frey 2008a).

This paper expands on this latter theme. High work satisfaction for the self-employed has often been interpreted to mean that the self-employed are happier with their lives, although strictly speaking, the evidence on the self-employment-happiness relationship is considerably weaker and more mixed than for work satisfaction. Many studies confirm a high work satisfaction of the self-employed, but only few find a direct relationship with life satisfaction/happiness measures (e.g., Binder and Coad 2013). In the present study we explore these questions with a large German household panel data set and ask whether the self-employed in Germany are more satisfied with work and life than their employed counterparts. Given the need for high-quality replication studies (Aguinis and Edwards 2014; Evanschitzky et al. 2007), we replicate and substantively extend a study from the UK with German data (Binder and Coad 2013).

In addition, our paper goes beyond previous work by contributing novel insights to the literature in a variety of ways: in order to explore the crowding-out hypothesis, we analyze to what extent self-employment impacts different domains of life of the self-employed, making use of the rich data set at hand. We thus take a broader “life domain view” and look into whether going into self-employment has an impact on life domains ranging from work satisfaction to satisfaction with health, household income, leisure time, standard of living, dwelling, housework and family life. With this focus on different domain satisfaction as a complement to life satisfaction as dependent variable, our paper is related to some recent papers that try to unpack life satisfaction into its constituent parts (van Praag et al. 2003; Powdthavee 2012; Binder and Coad 2015).

We also explore the self-employment-happiness nexus by distinguishing whether individuals pursue self-employment in order to exploit new business opportunities versus individuals who become self-employed out of sheer necessity in order to escape unemployment. It has been shown in previous work that this distinction can account for differences in life satisfaction of the self-employed, with opportunity pursuing entrepreneurs being significantly more happy than their employed peers, and necessity entrepreneurs not being so (Binder and Coad 2013). Finally, we also look into the question whether company size, autonomy of one’s job as well as the industry in which one works have a bearing on work and life satisfaction of our German sample.

Our paper proceeds in the following way: we first give a short overview over the pertinent literature background in Sect. 2 and proceed then to our analysis in Sect. 3, where we discuss data set and variables, present our results as well as a number of extensions. We conclude in Sect. 4.

2 Literature Background

Subjective well-being (SWB, or synonymously “happiness”) has been intensively studied in recent years and is linked to a range of determinants that seem to reliably influence it the world over (Frey and Stutzer 2002, 2005; Dolan et al. 2008; Graham 2009; Layard et al. 2012): opportunities for gainful employment and work organization are one of its most important determinants. But the relationship between subjective well-being and self-employment¹ is complicated: if we measure subjective well-being as job/work satisfaction, findings are consistently positive. Multiple studies report “rather robust finding[s] across the nations on which data are available” that self-employment is related to higher overall *job satisfaction* (Blanchflower 2004), this being the case in the US (Blanchflower and Oswald 1998; Kawaguchi 2008) and other OECD countries (Blanchflower 2000; Blanchflower et al. 2001; Clark et al. 2008).²

High job satisfaction is thus one principal return to entrepreneurship, despite a number of drawbacks such as lower monetary returns to self-employment (Hamilton 2000),³ higher variability of returns (Praag and Versloot 2007), fewer fringe benefits (Storey 1994, Ch. 6), longer working hours (Ajayi-obe and Parker 2005; Hyytinen and Ruuskanen 2007) and higher levels of stress (Andersson 2008; Schieman et al. 2006; Parasuraman and Simmers 2001).

Positive overall job satisfaction despite some objectively worse outcomes of self-employment has been explained with reference to “procedural utility” that the self-employed derive from their work (Benz and Frey 2008a, b): self-employed individuals obtain satisfaction from leading an independent lifestyle and “being their own bosses”. Hundley (2001) finds that the self-employed are more satisfied with their jobs mainly because of greater autonomy, but also because of more flexibility, skill utilization and, to some extent, higher (perceived) job security (see also, Carter et al. 2003; Feldman and Bolino 2000; Parasuraman and Simmers 2001).⁴ The autonomy of being self-employed here is probably the most consistent explanation for higher job satisfaction and finds corroboration through self-determination theory (Deci and Ryan 2000): the need for autonomy and its satisfaction were shown in psychological research to be robustly related to better psychological functioning and well-being. Such an explanation would also be consistent with findings that employees have a lower job satisfaction in large firms compared to small firms (Idson 1990; Benz and Frey 2008a).⁵

But one should also be aware of the fact that there remain issues of reverse causality regarding the relationship between job satisfaction and self-employment: Kawaguchi (2008) observes that job quitting tends to follow low job satisfaction and Noorderhaven et al. (2004)

¹ We (and much of the literature) use the terms self-employment and entrepreneurship interchangeably for ease of reference (on this practice see also Carter 2011). Some might consider there to be differences between entrepreneurship and self-employment, e.g. in terms of innovation, growth ambition, etc. Bear in mind that when talking about entrepreneurship in this paper, we refer to self-employment.

² See, however, Hanglberger and Merz (2011) for some evidence that this positive effect is driven in parts by anticipation and adaptation effects and largely disappears when controlling for those.

³ Typical returns to self-employment are lower than compared to earnings for being employed, but there are issues of underreporting of returns of the self-employed for tax reasons, as well as other considerations that warrant further research on this front (Carter 2011).

⁴ Interestingly, the latter has been identified to decrease job satisfaction in a recent study of European self-employment (Millán et al. 2013).

⁵ Also, the positive effect of being self-employed on job satisfaction diminishes markedly when taking into account the heterogeneity of the control group of the employed in terms of the size of the firm they are working in Benz and Frey (2008a, p. 374), as well as when accounting for the afore-mentioned anticipation and adaptation effects (Hanglberger and Merz 2011).

find a positive association of the levels of “dissatisfaction with life” observed in a society with high self-employment rates. This means that low satisfaction (with job or life) could “push” individuals into self-employment (but see the negative evidence for this in Schjoedt and Shaver 2007). At least on the macro level, an association with low satisfaction and self-employment could also be explained with reference to necessity entrepreneurship, i.e. large numbers of individuals in poor countries are forced into self-employment to escape unemployment and there would be no reason to suspect that these individuals would experience higher well-being from their situation (compare also Bianchi 2012).

The above findings notwithstanding, satisfaction with work (as analyzed in most studies as proxy for well-being) does not equal life satisfaction, but is merely one life domain amongst others, which all together determine an individual’s life satisfaction (van Praag et al. 2003; Schjoedt and Shaver 2007; Powdthavee 2012; Binder and Coad 2015). If self-employment would contribute positively to work satisfaction but decrease satisfaction with other domains of life (e.g., with the financial situation or with leisure time), it is not *prima facie* clear what the net effect on life satisfaction would be (see also McAdams et al. 2012, on this “bottom-up” approach as to how domain satisfactions contribute to life satisfaction). As such, taking job satisfaction results and arguing that individuals derive higher (overall) well-being from being self-employed seems to be a sleight-of-hand that might distract from the direct analysis of the relationship between self-employment and life satisfaction.

When looking for evidence for the impact of self-employment on life satisfaction proper, the picture becomes much more ambiguous (Dolan et al. 2008, p. 101): Blanchflower and Oswald (1998) report for cross-sectional data from the US that young self-employed are happier, and in a similar vein Craig et al. (2007) provide some evidence for this relationship from Australian small businesses. Looking at European countries, Blanchflower (2004) fails to find overly strong effects of self-employment on life satisfaction (only for subgroups, self-employment is significantly related to life satisfaction; and strongly depending on the data set used). Evidence about this relationship is scant (Harbi and Grolleau 2012; Andersson 2008, p. 231).

The empirically weak association between self-employment and life satisfaction might be a result of the above-mentioned domain view of well-being. Highly satisfied with their jobs, the self-employed ignore other important life domains and turn out to be less satisfied in those, leading to an overall sketchy association of self-employment and global well-being. We could call this a “crowding out” phenomenon, where the work domain and its associated pleasures crowd out pleasurable experiences in other life domains. An alternative explanation could be that the self-employed are a rather heterogeneous group (Santarelli and Vivarelli 2007) and only certain forms of self-employment might be conducive for subjective well-being, for example when individuals pursue entrepreneurial opportunities as opposed to being forced into self-employment to avoid unemployment (Reynolds et al. 2005; Block and Koellinger 2009). This hypothesis has been pursued by Binder and Coad (2013), who distinguished between what has been called necessity and opportunity self-employment (Reynolds et al. 2005), and argued that individuals who seek self-employment out of necessity and to avoid unemployment might not profit at all from becoming self-employed (Fuchs-Schündeln 2009). Only individuals who voluntarily go into self-employment to pursue entrepreneurial opportunities can be conjectured to enjoy the entrepreneurial life-style and enjoy procedural utility from becoming self-employed.⁶

⁶ Cooper and Artz (1995) found that entrepreneurs with initially high expectations for their business venture performance turned out to be more satisfied than other entrepreneurs, suggesting that these more satisfied individuals have some more optimistic personality traits that influence their subsequent job satisfaction.

With BHPS data, it could indeed be shown that opportunity self-employed were significantly more satisfied with their life overall than their employed counterparts (Binder and Coad 2013, but a similar difference could not be established for the necessity case).⁷ From a theoretical point of view, this finding is also in line with self-determination theory that argues that individuals only derive well-being benefits from autonomous action, whereas being forced into self-employment seems to be a paradigmatic case of the opposite (even if the self-employed afterwards enjoy some autonomy in their job itself).

Given these two observations about different types of self-employment as well as the under-researched question of domain satisfactions of the self-employed in domains other than work satisfaction, our empirical approach will attempt to fill these gaps and analyze the satisfaction of the self-employed in different life domains as well as separating the self-employed into a group of opportunity and a group of necessity entrepreneurs. Analysing the impact of self-employment on different domain satisfactions is also worthwhile because these domain measures tend to be more reliable than global judgements of overall life satisfaction (Schwarz and Strack 1999; Krueger and Schkade 2008).

Based on this literature review, we hypothesize that

- (H1a)** Work satisfaction of German self-employeds will be higher than work satisfaction of their employed counterparts.
- (H1b)** Life satisfaction of German self-employeds will be higher than life satisfaction of their employed counterparts only if they pursue “opportunity self-employment”.

We also further want to explore the following hypotheses

- (H2)** Crowding out: SE due to its demands on a person’s time will have negative effects on life domains other than work (e.g. social life and leisure time). We do not hypothesize on the direction of SE as regards other life domains, as there is no clear theoretical explanation for directional hypotheses
- (H3)** Role of autonomy: Concerns for autonomy drives job selection and satisfaction so that individuals with more autonomy in their jobs will report higher job and life satisfaction (see also Coad and Binder 2014).

Apart from these hypotheses, we also explore whether industry type and company size have an influence on reported satisfaction. Since our work is exploratory in nature, and we have few clear theoretical predictions in this area to guide our analysis, we argue that this area is worth investigating even if we do not develop detailed hypotheses about the direction of all effects (cf. Helfat 2007).

3 Analysis

For the empirical part, we mainly rely on matching techniques (see, e.g., Lechner 2009; Böckerman and Ilmakunnas 2009; Oakes and Kaufman 2006), in order to replicate the study by Binder and Coad (2013) faithfully, but also because multivariate regression modeling gives no consideration to the distribution of covariates in the treatment versus

Footnote 6 continued

Whether there are certain personality traits that facilitate self-employment and the related satisfaction derived from it is still a matter of active research (e.g. Caliendo and Kritikos 2012).

⁷ Block and Koellinger (2009) find a similar difference in terms of satisfaction with the startup, i.e. necessity entrepreneurs do not receive satisfaction from what they are forced to be doing.

control groups. Unless there is substantial overlap in the two sets of covariate distributions, multivariate regression estimates rely heavily on extrapolation, and can be misleading (Imbens 2004; Ichino et al. 2008, pp. 312–313). Matching estimators are preferable because an appropriate control group is established. Another advantage of matching methods is that they avoid assumptions on functional forms. It has to be noted that both multivariate regression and matching techniques are only as good as the set of covariates (or matching variables) selected. Identification rests on the quality of matching variables selected (selection on observables) and these should be selected with reference to theory and previous work (Caliendo and Kopeinig 2008).

3.1 Data Set and Variables

We use the German Socio-Economic Panel (SOEP) longitudinal data set which contains household and individual level micro-data on social and economic change in Germany. The data set now comprises around 12,000 households (approximately 20,000 persons). It has started out in 1984 with 6,000 households which were selected following multistage random sampling, aiming at a nationally representative selection of German households (for more information see Wagner et al. 2007; Haisken-DeNew and Frick 2005).

We focus mostly on working individuals, tracking those individuals who transition from either employment or unemployment into self-employment. We omit those cases where individuals do not report our main variables, and effectively have an unbalanced panel sample of 270, 094 observations spanning 1997–2010, due to the subjective health variable only being asked quite late into the panel as well as the self-employment variable being changed in 1997. A summary overview of the variables used in subsequent analysis is given in Table 1, where we split the sample into employed, self-employed and unemployed individuals.

For our analysis, the main dependent variables are life satisfaction, work satisfaction as well as a number of other domain satisfactions. The SOEP has contained a life satisfaction question from 1984 on. Respondents are asked how satisfied, all in all, they are with their life at the moment (“today”). The answer is given on an ordinal scale, eleven point Likert scale ranging from 0 (lowest satisfaction) to 10 (highest satisfaction). This measure has been extensively used in the literature on subjective well-being. The validity of such subjective well-being measures has been established within the psychological and economic literature (Diener et al. 1999; Helliwell and Wang 2012; Layard et al. 2010), and subjective well-being measures correlate in the expected directions with a number of objective factors such as e.g. emotional expressions like smiling (Fernandez-Dols and Ruiz-Belda 1995). Individuals are also able to (ordinally) compare and assess other individuals’ happiness, for example when individuals’ self-reports are correlated with reports of friends and family (Sandvik et al. 1993; Diener and Lucas 1999). As regards these measures’ reliability, the consensus is that they quite reliably measure the intended individual well-being. The test–retest reliability of subjective well-being constructs lies between 0.5 and 0.7 (over 2 weeks, see Krueger and Schkade 2008).⁸ We also look at other domain satisfactions, ranging from work satisfaction (which measures the overall satisfaction with the job) to satisfaction with health, household income, leisure time, standard of living, dwelling, housework and family life. These are measured on the same scale as life satisfaction as responses to the question “How satisfied are you today with the

⁸ We treat this measure as cardinal at various instances throughout our analysis since it was shown in the literature that this does not alter findings substantially and it allows us to use a fixed-effects regression framework Ferrer-i-Carbonell and Frijters (2004).

Table 1 Descriptive statistics, broken down by employment type

	Employed			Self-employed			Unemployed		
	Mean	SD	Count	Mean	SD	Count	Mean	SD	Count
Satisfaction with...									
Life today	7.12	1.60	96,941	7.10	1.72	12,355	6.44	2.03	44,216
Work	7.04	1.96	95,797	7.28	2.00	12,204	3.76	3.34	4,009
Health	7.01	1.96	96,770	7.06	2.01	12,335	6.04	2.40	44,133
Household income	6.52	2.04	96,069	6.51	2.29	12,266	5.55	2.58	43,724
Leisure time	6.45	2.15	96,677	5.63	2.55	12,306	7.42	2.13	44,006
Standard of living	7.15	1.66	70,683	7.24	1.83	8,772	6.53	2.14	33,954
Dwelling	7.72	1.86	96,620	7.93	1.87	12,322	7.53	2.06	44,047
Housework	6.69	1.98	64,917	6.44	2.16	7,629	6.56	2.01	37,634
Family life	7.70	1.93	32,850	7.60	2.06	4,576	7.69	2.09	13,445
Log(income)	10.03	0.43	96,941	10.36	0.60	12,355	9.69	0.56	44,216
Marriage dummies									
Married	0.62	0.49	96,941	0.68	0.47	12,355	0.72	0.45	44,216
Separated	0.02	0.14	96,941	0.03	0.16	12,355	0.02	0.14	44,216
Widowed	0.01	0.11	96,941	0.02	0.13	12,355	0.05	0.22	44,216
Divorced	0.08	0.28	96,941	0.10	0.31	12,355	0.08	0.28	44,216
Spouse away	0.00	0.03	96,941	0.00	0.00	12,355	0.00	0.03	44,216
Household type dummies									
1-Pers.-HH	0.13	0.34	96,941	0.13	0.34	12,355	0.11	0.31	44,216
Couple without children	0.29	0.46	96,941	0.29	0.46	12,355	0.40	0.49	44,216
Single parent	0.04	0.20	96,941	0.03	0.18	12,355	0.06	0.23	44,216
Couple with children LE 16	0.25	0.43	96,941	0.27	0.44	12,355	0.17	0.38	44,216
Couple with children GT 16	0.19	0.39	96,941	0.16	0.37	12,355	0.16	0.37	44,216
Couple with children LE and GT 16	0.07	0.26	96,941	0.08	0.27	12,355	0.06	0.24	44,216
Multiple generation-HH	0.02	0.12	96,941	0.01	0.11	12,355	0.02	0.16	44,216
Other combination	0.01	0.10	96,941	0.02	0.12	12,355	0.02	0.12	44,216
Number of persons in HH	2.83	1.25	96,941	2.85	1.25	12,355	2.76	1.33	44,216
d_disabled	0.05	0.22	96,941	0.03	0.18	12,355	0.21	0.41	44,216
Gender	0.33	0.47	96,941	0.27	0.44	12,355	0.64	0.48	44,216
Age	41.62	10.78	96,941	46.24	10.60	12,355	50.23	13.01	44,216
Age ²	133.52	151.34	96,941	112.50	149.41	12,355	189.13	156.33	44,216
Education dummies									
(0) In school	0.00	0.01	96,941	0.00	0.01	12,355	0.00	0.05	44,216
(1a) Inadequately completed	0.01	0.11	96,941	0.01	0.07	12,355	0.05	0.22	44,216
(1b) Elementary	0.06	0.23	96,941	0.03	0.16	12,355	0.17	0.37	44,216
(1c) Basic vocational	0.25	0.43	96,941	0.21	0.41	12,355	0.36	0.48	44,216

Table 1 Descriptive statistics, broken down by employment type

	Employed			Self-employed			Unemployed		
	Mean	SD	Count	Mean	SD	Count	Mean	SD	Count
(2b) Middle general	0.02	0.15	96,941	0.02	0.13	12,355	0.04	0.19	44,216
(2a) Middle vocational	0.31	0.46	96,941	0.26	0.44	12,355	0.22	0.42	44,216
(2c_gen) Higher general	0.01	0.11	96,941	0.03	0.17	12,355	0.01	0.11	44,216
(2c_voc) Higher vocational	0.08	0.27	96,941	0.08	0.27	12,355	0.04	0.19	44,216
(3a) Lower tertiary	0.08	0.27	96,941	0.10	0.30	12,355	0.03	0.18	44,216
(3b) Higher tertiary	0.18	0.38	96,941	0.28	0.45	12,355	0.08	0.26	44,216
Subj. health	3.60	0.83	96,941	3.62	0.84	12,355	3.10	1.01	44,216
d_German	0.92	0.28	96,941	0.94	0.23	12,355	0.86	0.34	44,216
Observations	96,941			12,355			44,216		

following areas of your life?” (respondents can answer from 0 “totally unhappy” to 10 “totally happy”). Many domain satisfactions were only elicited in fewer waves, however. Moreover, while life satisfaction was available for our full sample (for the FE regressions), work satisfaction, for instance, was mostly reported by employed individuals and very few unemployed individuals (FE regression sample size of 159, 920). Empirically, domain satisfaction judgements turn out to be more reliable than life satisfaction judgements (Schwarz and Strack 1999; Krueger and Schkade 2008), with reliabilities from 0.68 to 0.74 as opposed to 0.54 for the more global life satisfaction (Krueger and Schkade 2008, p. 1838). This does make sense from a theoretical point of view if one considers that individuals can more easily assess their life in a single domain as opposed to somehow aggregating their domain satisfaction judgments into a comprehensive well-being assessment (it is likely that such life satisfaction assessments are arrived at via heuristics, for example by recourse to recent salient events or using current mood as a proxy, see Schwarz and Strack 1999).

Our main independent variable is self-employment and other labor-force statuses as control categories. We count individuals as self-employed who work full-time and are self-employed (10, 194 obs.), freelance (4, 766 obs.) or help in their family business (642 obs.). We have excluded the category of self-employed farmers (685 obs.) because of difficulties in comparing this work with other jobs (Hundley 2001, p. 299).

Beside unemployment (we have included as unemployed those who report their labor-force status as “not working—unemployed” as well as those who report to be “non-working”),⁹ employment (we focus on individuals working full-time) and self-employment, we have added maternity-leave, retirement, being in education and completing one’s civil or military service in the fixed-effects regressions. In our main analysis, however, we focus only on these individuals who either switch from (un)employment to self-employment (treatment group) or those who remain in (un)employment (control group).

Our measure of income is equivalized (with the International Experts’ scale) and deflated post-government household income (i.e. income after taxes and government transfers; see similarly Headey et al. 2004; D’Ambrosio and Frick 2007). In line with the literature, we use the *logarithm* of the income measure as a regressor in our analysis, assuming that a given change in the proportion of income leads to the same proportional change in well-being (Stevenson and Wolfers 2008; Layard et al. 2008).

⁹ Of these, a minority reports work domain satisfaction judgements, which are summarized in Table 1. We interpret these to refer to individuals’ dissatisfaction with not having a job.

As a measure for an individual's health, we use self-rated health. Self-rated health is a subjective health indicator, ordinally scaled on a five point Likert scale ranging from 1 ("very good") to 5 ("bad") and a dummy variable for being disabled. Lastly, we have included a number of ordinary control variables (see Table 1) which comprise gender, different marital statuses, household size and composition variables, age, and age² (the squared difference between age and mean-age to be precise). We control for year effects and regions (German "Bundeslaender" and East vs. West-Germany) but do not report this to conserve space. Also included is an educational control variable, viz. an individual's highest level of education, as measured by the CASMIN scale. This is measured by converting the reported categories, ranging from zero ("In School") to nine ("Higher Tertiary Education"), into a series of dummy variables (Table 7 in the "Appendix" shows the contemporaneous correlations of our main variables).

3.2 Main Results: Work and Life Satisfaction

Are the self-employed in Germany more satisfied with their work and life than other individuals? Neither the simple comparison of means (Table 1) nor our baseline fixed-effects regressions (see Table 2, column 1) would suggest that the self-employed are happier with their lives than the control group. However, they are more satisfied with their work (0.30***). To compare the effect size of self-employment consider the strong negative effect (-2.58***) of unemployment on work satisfaction (where reported, see Table 2, column 2) and life satisfaction (-0.30***).¹⁰ These findings are typical for most of the literature, as are many of the coefficients for our control variables (we refrain from further discussing these here to conserve space, but compare Dolan et al. 2008; Layard et al. 2012).

Our matching estimates of becoming self-employed on subjective well-being are presented in Tables 3 and 4. Matching estimates (Rubin 1974; Imbens 2004; Caliendo and Kopeinig 2008) allow us to more carefully select a control group of similar individuals to those who go into self-employment ("perfect twins" with the one exception that these control individuals do not actually get into self-employment but remain either employed or switch from unemployment into employment, Almus and Czarnitzki 2003, p. 231). It is an econometric technique that bears similarities to an experimental setup in medical research but can be applied to observational data to recreate a "control group" that is comparable to the "treatment group" in terms of observed variables (without actually having to conduct a trial). The identifying assumption is a conditional independence assumption (CIA), which holds that the potential outcome (subjective well-being) and "treatment" participation (going into self-employment) are independent for individuals with the same exogenous characteristics, i.e. we rule out differences between the control and treatment groups in terms of unobserved variables. CIA may be a strong assumption, and moreover it cannot be verified directly but only with reference to theoretical considerations of what drives treatment and outcome. In order to justify the identifying assumption, we have selected our matching variables drawing on the subjective well-being and entrepreneurship literature (and with an eye to maintaining comparability to the study of Binder and Coad 2013). The second matching assumption is known as "overlap", or the "common support condition". This assumption ensures that individuals with the same characteristics have a positive probability of being either "participants" (i.e. becoming self-employed) or "nonparticipants" (staying in (un)employment). In further analysis we find considerable support for

¹⁰ Excluding "non-working" individuals and focussing only on individuals whose labor-force status is "unemployed" doubles the coefficient size to -0.60***.

Table 2 Baseline regressions

	(1) Life satisfaction (FE)		(2) Job satisfaction (FE)	
Log(income)	0.1581***	(12.99)	0.1240***	(5.37)
Employment dummies				
Unemployed	-0.3022***	(-20.98)	-2.5761***	(-36.48)
Selfemployed	0.0168	(0.54)	0.3021***	(6.51)
Maternityleave	0.0197	(0.76)	-0.6788***	(-6.07)
Retired	-0.1738***	(-8.60)	-1.4187***	(-6.33)
Education	0.0227	(0.99)	-0.5422***	(-5.26)
Civil/military service	-0.1072	(-1.07)	-0.3917	(-1.64)
Marriage dummies				
Married	0.0721**	(2.72)	0.0512	(1.27)
Separated	-0.1272**	(-2.77)	0.1568*	(2.47)
Widowed	-0.1091	(-1.86)	0.0712	(0.58)
Divorced	0.1192**	(2.92)	-0.0106	(-0.17)
Spouse away	1.0082*	(2.19)	-0.9045*	(-2.10)
Household type dummies				
Couple without children	0.1803***	(7.08)	-0.0418	(-1.05)
Single parent	-0.0932**	(-2.70)	0.1023	(1.84)
Couple with children LE 16	0.1984***	(5.78)	0.0752	(1.38)
Couple with children GT 16	0.0657*	(1.97)	0.0515	(0.96)
Couple with children LE and GT 16	0.1331***	(3.52)	0.0857	(1.42)
Multiple generation-HH	0.1533**	(2.66)	0.0160	(0.16)
Other combination	0.0391	(0.80)	-0.1601	(-1.91)
Number of persons in HH	-0.0076	(-0.80)	0.0028	(0.17)
d_disabled	-0.1468***	(-6.73)	-0.1203*	(-2.42)
Age	-0.0035*	(-2.39)	-0.0246***	(-9.48)
Age ²	-0.0001*	(-2.44)	0.0000	(0.17)
Education dummies				
(0) In school	0.2931***	(4.40)	-0.5696**	(-2.84)
(1b) General elementary school	0.1504**	(2.67)	0.0593	(0.57)
(1c) Basic vocational qualification	0.0804	(1.35)	0.0277	(0.26)
(2b) Intermediate general qualification	0.1230	(1.92)	0.1271	(1.04)
(2a) Intermediate vocational	0.1097	(1.77)	0.0873	(0.76)
(2c_gen) General maturity certificate	0.1244	(1.89)	0.2926*	(2.16)
(2c_voc) Vocational maturity certificate	0.1073	(1.58)	0.2199	(1.68)
(3a) Lower tertiary education	0.1806*	(2.50)	0.3373*	(2.44)
(3b) Higher tertiary education	0.1235	(1.76)	0.3243*	(2.34)
Subj. health	0.4950***	(89.99)	0.4159***	(45.68)
d_EastGermany	-0.0953	(-1.07)	-0.0614	(-0.37)
Constant	3.9640***	(22.14)	5.1243***	(15.85)
Observations	27,0094		15,9920	
R ²	0.086		0.074	
F	185.5822		75.4303	

Table 2 continued

	(1) Life satisfaction (FE)	(2) Job satisfaction (FE)
df_r	40,475	29,512

We use a fixed-effects regression framework with life satisfaction (column 1) and job satisfaction (column 2) as dependent variables. Our regression contains the employment type as our main independent variable and in addition to that typical control variables from marriage status, household type to education, health and a region dummy. We cluster robust standard errors on the individual. Time and regional dummies are used but not reported

t statistics in parentheses

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

the common support condition (the methodological background of matching is further discussed in Oakes and Kaufman 2006; Caliendo and Kopeinig 2008; Binder and Coad 2013).

FE models such as our baseline regressions obscure the number of observations on which coefficients for treatment variables are based, and can suffer from problems of endogeneity and self-selection, as well as the lack of potential common support for treatment and control group. More reliable estimates of the impact of self-employment on subjective well-being may be gained by using matching estimates that are less prone to the aforementioned problems. In our matching analysis, we compare individuals that are similar at time point t in terms of a large number of covariates of interest such as income, health and all other covariates described in Sect. 3.1 (see also Table 1). We then look at individuals that (1) move from being employed in t to self-employment in $t + 1$ and later periods, and compare them to individuals who stay employed during the three following lags.¹¹ We interpret this as the “opportunity self-employment case”, where individuals leave their employment to pursue new business opportunities. We (2) contrast this case with the case where individuals are unemployed in t and move to self-employment in $t + 1$ and later periods. In this “necessity self-employment case”, our control group are individuals who move from unemployment into employment in the subsequent lags. Obviously both cases are quite coarse operationalizations of opportunity and necessity entrepreneurship, however, it is difficult to otherwise infer the motivation for self-employment in the data set used in our analysis.

We use two different matching estimators, namely propensity-score matching (Leuven and Sianesi 2003) and nearest-neighbour-matching (Abadie et al. 2004). Nearest neighbour matching finds a match in many dimensions simultaneously while propensity score matching collapses all covariates into one composite variable (the so-called “propensity score”). We use the same set of covariates in both cases, namely previous change in

¹¹ We focus on three lags, mostly because taking longer lags would give us a lower number of observations (i.e. data limitations) and for allowing easy comparability with previous investigations (e.g. Binder and Coad 2013), and because we suspect that 3 years is long enough to pick up the most interesting effects immediately associated with a transition into self-employment. In a five-lag model not shown here, the fourth and fifth lag show extremely decreased numbers of people (only 42 unemployment to self-employment cases in $t + 4$ and 25 in $t + 5$), which decreases the reliability of statistical inference. In the longer lags, no statistically significant effects are found beyond the fourth lag for the opportunity case (PSM coefficient: 0.29*). While hedonic adaptation is still ill understood, assessing longer lags would be desirable, given better data, and from Clark et al. (2008), we know that some life events have a more lasting influence over time. Whether self-employment belongs into that category seems questionable but should be further analyzed in future research.

Table 3 Matching estimates of the effect of moving into self-employment on life satisfaction (left) and job satisfaction (right)

	Life satisfaction			Job satisfaction		
	E to SE versus E to E			E to SE versus E to E		
	ATT	Controls	Treated	ATT	Controls	Treated
1 lag	0.128+	60,843	485	0.436***	60,289	481
SE	0.075			0.094		
<i>t</i> stat	1.71			4.64		
2 lags	0.173+	47,312	308	0.477***	46,711	304
SE	0.093			0.109		
<i>t</i> stat	1.86			4.37		
3 lags	0.306**	36,713	215	0.488***	36,916	215
SE	0.109			0.132		
<i>t</i> stat	2.80			3.69		
	UE to SE versus UE to E			UE to SE versus UE to E		
1 lag	-0.044	1,628	194	0.140	1,634	185
SE	0.135			0.178		
<i>t</i> stat	-0.33			0.79		
2 lags	-0.255	793	108	0.355+	773	109
SE	0.194			0.207		
<i>t</i> stat	-1.32			1.72		
3 lags	-0.075	499	68	0.236	491	65
SE	0.217			0.269		
<i>t</i> stat	-0.35			0.88		

Effects of moving into self-employment on satisfaction in the following 3 years (lags 1–3) are reported. The upper half of the table shows results for moving from employment to self-employment whereas the lower half of the table analyses moving from unemployment to self-employment. We use propensity score matching (PSM, Leuven and Sianesi 2003) and report Average Treatment effects for the Treated (ATTs) with *t* statistics. Dependent variables are same as in the baseline regressions. We match on a range of covariates discussed in the text. Key to significance levels: + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

subjective well-being, previous subjective well-being, log(income), subjective health, being disabled, diverse marital dummies (being married, separated, divorced or widowed, having a spouse outside of Germany), gender, age, a quadratic age term, household size, dummies for education, household type, state dummies, a dummy for living in East Germany as well as year dummies.

The results look rather similar across different matching algorithms, which provides already a test of the robustness of our results (Caliendo and Kopeinig 2008).¹² We can see that there are actually not as many cases where individuals transition from unemployment into employment or self-employment, something that is somewhat obscured in typical

¹² One exception to this constitutes the use of caliper matching, which increases the variance of the estimates (Caliendo and Kopeinig 2008, pp. 42–45) and leads to a loss of significance in our model for life satisfaction. Coefficients are positive in lags $t + 2$ and $t + 3$ in this case, however, as well.

Table 4 Matching estimates of the effect of moving into self-employment on life satisfaction (left) and job satisfaction (right)

	Life satisfaction		Job satisfaction	
	E to SE versus E to E		E to SE versus E to E	
1 lag	0.241**	62,998	0.525***	62,447
SE	0.079		0.105	
<i>z</i> stat	3.06		5.02	
2 lags	0.176+	49,737	0.410**	49,286
SE	0.101		0.125	
<i>z</i> stat	1.74		3.28	
3 lags	0.330**	39,327	0.459**	39,156
SE	0.117		0.150	
<i>z</i> stat	2.81		3.05	
	E to SE versus E to E		E to SE versus E to E	
1 lag	-0.096	1,912	0.052	1,882
SE	0.145		0.197	
<i>z</i> stat	-0.67		0.27	
2 lags	-0.373+	1,067	0.188	1,058
SE	0.197		0.239	
<i>z</i> stat	-1.90		0.78	
3 lags	-0.107	728	0.140	719
SE	0.231		0.304	
<i>z</i> stat	-0.46		0.46	

Effects of moving into self-employment on satisfaction in the following 3 years (lags 1–3) are reported. The upper half of the table shows results for moving from employment to self-employment whereas the lower half of the table analyses moving from unemployment to self-employment. We use nearest-neighbour-matching (NNM, Abadie et al. 2004) and report sample average treatment effects (SATEs) with *z* statistics. Dependent variables are same as in the baseline regressions. We match on a range of covariates discussed in the text. Key to significance levels: + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. 4 matches are selected for each treatment observation

regression tables (such as Table 2). Focussing on transitions into self-employment that last for up to three consecutive years further reduces the number of cases in our data set. Since matching also discards observations that are off-support, i.e. individuals that are very different in terms of matching covariates are not compared with each other in order to avoid “comparing apples with oranges”, we have to rely on a comparatively smaller number of cases. Yet matching creates a better comparable treatment and control group and thus despite a smaller sample yields significant results. Discarding the ‘evil twins’ in favor of finding the “perfect twin” (Almus and Czarnitzki 2003, p. 231) for each observation thus increases the explanatory power of our estimates.

In our interpretation we focus on the propensity score matching results subset (Table 3): we can see that in the case of “opportunity self-employment”, both work and life satisfaction of the self-employed are significantly higher than that of their employed counterparts. The coefficient on the first lag is 0.436, which indicates that the job satisfaction score (measured on an 11-point Likert scale, as described before) will be 0.436 points higher in time $t + 1$ as a result of an individual moving into self-employment (at $t + 1$)

from previous employment (t), when compared to a ‘control group’ of comparable individuals who remain in employment from t to $t + 1$. While the effect for work satisfaction is 0.436^{***} in lag $t + 1$ and increases to 0.488^{***} in year $t + 3$ (both highly significant), the effect is less pronounced but also increasing for life satisfaction (from 0.128^+ in year $t + 1$ to 0.306^{**} in year $t + 3$). If one does pursue self-employment from the security of one’s previous job and leaves employment for self-employment, there seem to be positive returns to work and life satisfaction for the self-employed. As self-employment is unlikely to result in higher incomes of the self-employed (except for a few exceptional cases, see Hamilton 2000), this increased satisfaction must be due to other work related factors of self-employment, most likely the autonomy that is afforded by being one’s own boss (Deci and Ryan 2000; Feldman and Bolino 2000; Benz and Frey 2008a).

The necessity case is markedly different: both life satisfaction and work satisfaction show no significant change for the treatment as opposed to the control group. In the case of work satisfaction, coefficients are positive and insignificant (the exception is a positive coefficient in lag $t + 2$). In the case of life satisfaction, coefficients are negative and insignificant. We interpret this as evidence consistent with the hypothesis that pursuing self-employment to escape unemployment has no benefits in terms of work and life satisfaction for the newly self-employed. This interpretation is consistent with the data, where the autonomy of necessity self-employed individuals is lower (t test highly significant) than that of opportunity cases. Comparatively more individuals are in the lower categories of the autonomy variable that is present in the data set. From the point of view of self-determination theory, these results are not surprising, since being forced into self-employment is not an autonomous decision, and it can be conjectured that the necessity self-employed thus experience their new life (and lifestyle) as something they cannot strongly identify with. Our results are rendered more surprising given findings in the literature that happy individuals are more likely to pursue necessity self-employment (Krause 2013). Such reverse causality should actually inflate the impact of necessity self-employment on subjective well-being.

From a policy point of view, being self-employed as opposed to being unemployed might certainly be preferable (in terms of individuals earning their own income). Our findings for the necessity case should not be understood to discourage self-employment as an alternative to being on welfare. However, this type of self-employment cannot be expected to be as beneficial for the self-employed as is the case for “opportunity self-employment”.

We can compare our results also to the results for the British case (see Binder and Coad 2013) and have to conclude that both analyses yield similar estimates: in the British case as well, transitioning from employment to self-employment yields positive life satisfaction changes ($.168^{**}$ to $.228^*$ for the nearest-neighbour-matching estimator and $.112^*$ to $.198^*$ for the propensity score matching estimator; only 2 years studied; no work satisfaction results).¹³ We should be careful in attributing higher impact for the German case since life satisfaction in the British sample was measured on a 7-point Likert scale. Similarly, no gains in life satisfaction were found in the UK for the transition out of unemployment into self-employment. This comparison provides evidence that the British findings were not something culturally limited to the UK but might apply more broadly in Europe as well. Note that Table 4 provides nearest-neighbour-matching estimates as comparison for the

¹³ Note that matching estimates refer to total effects on subjective well-being while regression coefficients are *ceteris paribus* effect sizes, holding all other variables of interest constant (Oakes and Kaufman 2006, p. 382). They should not be directly compared with each other, thus, and comparison of our results with other studies using multivariate regression is not straightforward.

robustness of our results with respect to matching algorithm and shows similar results. As in the British case, with the stricter (non-compensatory) matching algorithm, higher effects on satisfaction are exhibited. Overall, our findings support research hypotheses (H1a) and (H1b).

3.3 Results: Other Life Domains

It is instructive to see whether transitioning into self-employment will impact on subjective well-being more broadly. On this issue and to explore further whether going into self-employment does have broader effects beside the ones on an individual's work satisfaction, we look into other life domains and the individual's satisfaction with them after becoming self-employed. In Table 5, we show results similar to the analysis for work and life satisfaction (we match on the same covariates and with the same matching algorithms), but have different domain satisfactions as our dependent variables. The upper half of the table shows the results for the opportunity case while the lower half shows the necessity case. Our results here are quite striking in showing that self-employment has a quite contained impact only on few life domains. The most important results pertain to satisfaction with health and spare time. No matter which type of self-employment analyzed, the self-employed are significantly less satisfied with their spare time. The negative influence of lack of leisure time is increasing over time and even stronger for those who are self-employed out of necessity. Here our analysis confirms previous studies that find that the self-employed find themselves in a situation that puts high demand on their time and leads to lack of leisure time (Hyytinen and Ruuskanen 2007). Our findings here complement the literature by showing that this lack of leisure time does translate into dissatisfaction (at least in this specific domain; for a European data set, the self-employed also reported low satisfaction with their working hours, see Blanchflower 2004, p. 48).¹⁴ While one could conjecture that lack of leisure time is something only fully committed opportunity cases would exhibit, we clearly see a similar pattern for the necessity case. Even if forced self-employment has no benefit on work and life satisfaction, the self-employed clearly experience the negative impact of lower spare time satisfaction. Since the necessity self-employed arguably did not choose their self-employment fully voluntarily, it is even harder for them to deal with the time demands of their new career path, increasing dissatisfaction with amount of time outside their job. These findings can be related to a study of Dutch entrepreneurs whose satisfaction with leisure time was negatively associated with firm performance and positively with the motivation to combine work- and life-balance (Carree and Verheul 2012, p. 381). Care needs to be exercised in comparing both sets of results, since the Dutch analysis is cross-sectional and it only asks what influences leisure satisfaction of entrepreneurs (no control group). It thus may be that the negative impact of self-employment on satisfaction with spare time found in our study might be mitigated for those self-employed who pursue self-employment to get a more favourable work-/life balance and be better able to organize their workload to cope with multiple responsibilities (cf. *ibid.*).

A second finding of note pertains to health satisfaction, which is positively impacted by going into opportunity self-employment (but not going into necessity self-employment). While one can conjecture that both types of self-employment have higher autonomy as their result compared to the typical employment situation, there seems to be more

¹⁴ The opposite pattern was found for unemployment, where the unemployed exhibited higher satisfaction with their amount of leisure time in a British sample (Powdthavee 2012).

Table 5 Matching estimates of the effect of moving into self-employment on different domain satisfactions

Domain	Employment to self-employment case: propensity score matching (PSM) and nearest-neighbour-matching (NNM); different well-being domains										
	t+1		t+2		t+3		t+1		Transitions		
	PSM: b	SE	t-stat	SE	t-stat	SE	obs	t-stat	obs	t+2	t+3
	NNM: b	SE	z-stat	NNM: b	SE	z-stat	obs	z-stat	obs	t+2	t+3
Satisfaction with... health	0.3737*** 0.4244***	0.0858 0.0959	4.3566 4.4266	0.1127 0.1264	3.3760 3.0508	0.1381 0.1497	48311 49646	3.7093 3.7956	37073 39258	605	73737
Household income	0.1172 0.1680 -0.5696** -0.5812**	0.1039 0.1062 0.1090 0.1157	1.1284 1.5816 -5.2259 -5.0249	0.0741 0.0938 -0.6770*** -0.6871***	0.1264 0.1299 0.1330 0.1428	3.0589 3.7218 -4.8114 -4.8114	49371 49521 49235 49815	0.1468 0.1529 -0.8726*** -0.9106***	36942 39047 37134 39229	602	73276
Spare time										606	73676
Standard of living	0.1264 0.0680	0.0982 0.1028	1.2880 0.6615	0.1309 0.1383	-0.2612 0.0093	-2.7321 0.1732	29808 31454	-0.1268 0.1571	39229 29005	606	73738
Domicile	-0.0961 0.0622	0.0889 0.1067	-1.0811 0.6235	-0.0677 0.1069	-0.6708 0.1383	-4.7229 0.9831	47329 49371	-0.1718 0.1571	37154 39258	603	73673
Role in household	-0.1215 -0.1215	0.1351 0.1351	-0.8900 -0.8900	-0.1792 -0.1792	-0.2521 -0.2521	-1.792 -1.792	31373 31373	0.0355 0.0355	25262 25262	372	49601
Family	-0.1797 -0.0750	0.1988 0.2136	-0.9038 -0.3513	-0.6697* -0.8724*	0.2307 -0.3394	-1.1112 -2.2732	33898 8907	-0.8397 -0.8325	26927 3892	606	73610
										606	73610
										381	58123
										381	58123
										266	46349

Domain	Unemployment to Self-employment case: propensity score matching (PSM) and nearest-neighbour-matching (NNM); different well-being domains										
	t+1		t+2		t+3		t+1		Transitions		
	PSM: b	SE	t-stat	SE	t-stat	SE	obs	t-stat	obs	t+2	t+3
	NNM: b	SE	z-stat	NNM: b	SE	z-stat	obs	z-stat	obs	t+2	t+3
Satisfaction with... health	0.0753 0.1069	0.1586 0.1732	0.4938 -1.0039	0.2213 0.2338	0.3831 0.5728	0.2791 0.2918	881 1064	0.1102 0.7539	556 725	605	73737
Household income	-0.1850 -0.4266*	0.1843 0.1960	-1.0039 -2.1770	-0.5287* -0.8924***	-2.1426 -3.5378	0.2468 0.2982	891 1057	-1.2622 -1.3197	565 716	602	73276
Spare time	-0.5878** -0.6884**	0.1963 0.2131	-2.9951 -3.2301	-0.8968*** -0.9738***	-3.3412 -3.5082	0.2684 0.2776	887 1061	-3.7717 -4.0211	561 725	606	73676
Standard of living	-0.1552 -0.1937	0.1674 0.1873	-0.9270 -1.0038	-0.3745 -0.3708	-1.4229 -1.3397	0.2632 0.2651	475 573	-0.8448 -0.4764	174 472	606	73738
Domicile	-0.0937 -0.0937	0.1038 0.1038	-0.9038 -0.9038	-0.7676 -0.7676	-0.6399 -0.6399	-0.6399 -0.6399	1064 1064	-1.3012 -0.3566	723 723	603	73673
Role in household	-0.1317 -0.3257	0.2009 0.2238	-0.6557 -1.4552	-0.2752 -0.0715	-1.0379 0.2783	-0.3660 -0.2570	609 734	-2.1438 -3.6570	408 513	372	49601
Family										381	58123
										230	39380
										381	58123
										266	46349

Effects of moving into self-employment on satisfaction in the following 3 years (lags 1–3) are reported. Upper half of table refers to “opportunity self-employment” while lower half refers to “necessity self-employment”. We use propensity score matching (PSM, Leuven and Smaes 2003) and report Average Treatment Effects for the Treated (ATTs) with *t* statistics. For nearest-neighbour-matching (NNM, Abadie et al. 2004) we report Sample Average Treatment Effects (SATEs) with *z* statistics. Key to significance levels: + *p* < 0.10; * *p* < 0.05; ** *p* < 0.01; *** *p* < 0.001. 4 matches are selected for each treatment observation in the NNM case. Right-most part of the table lists numbers of observations transitioning into self-employment followed by number of control cases for each time lag and domain satisfaction

associated with the voluntary self-employment case, in that it seems beneficial not only for an individual's mental health (subjective well-being) but also for the individual's self-rated satisfaction with overall health. If the voluntary entrepreneurial pursuit thus also positively impacts on the self-employed's health, this would constitute another benefit of entrepreneurship beyond possible material gain.

We have to be careful in interpreting positive health satisfaction as positive health, however. A study on Swedish self-employed did similarly find that the self-employed report themselves under less mental strain, while at the same time exhibiting more mental health problems such as tiredness (Andersson 2008). An alternative explanation for this finding might thus lie in systematic personality differences between individuals who voluntarily pursue self-employment as opposed to those who do so involuntarily. If this is the case, satisfaction with health and life might be driven by this personality and not be a result of opportunity employment per se. It could be conjectured, for example, that more extraverted individuals are more confident and thus more likely to pursue self-employment and would simultaneously rate themselves more positively in terms of health and well-being. This alternative explanation, while *prima facie* plausible, would be difficult to reconcile with the fact that satisfaction in other domains of life of the self-employed does not exhibit a systematically higher score for the opportunity self-employed. Further research might explore these findings in the health domain (preferably measured via objective indicators).

Our results are consistent with other research on life domains:¹⁵ the high importance of health, job and leisure time (in that order of importance) was also found in an analysis of the overall contribution of life domains to life satisfaction (van Praag et al. 2003). In extension of these results, we can, however, see a marked asymmetry between opportunity and necessity self-employment over the different life domains analyzed: while the opportunity self-employed profit in work and health domains and suffer from lack of spare time (which could explain the moderate net gain in overall life satisfaction), the necessity self-employed profit from their self-employment in none of the life domains yet suffer from all the drawbacks (of negative spare time satisfaction). In sum, we find evidence for our hypothesis that work satisfaction of self-employed individuals seems to crowd out satisfaction in other domains of life such as leisure (H2).

3.4 Results: Robustness Tests

Given that autonomy is likely to be an important driver for our results (see, e.g. Coad and Binder 2014), it makes sense to unpack this relationship further. We have thus analyzed for our sample whether the autonomy of one's occupation as well as the company size and industry type one works in have an impact on work and life satisfaction. In order to analyze this further, the SOEP data set provides information on the autonomy of an individual's type of work via a variable that distinguishes autonomy levels *inter alia* based on task descriptions, vocational training, responsibilities and company size for civil servants, workers and employees and the self-employed. It distinguishes five regular autonomy levels plus the lowest level of apprenticeship (encompassing also interns and trainees). Low autonomy levels are related to manual workers, whereas manager and freelance academics are in the highest autonomy level group. Self-employed individuals are categorized into autonomy levels 3–5 depending on the number of employees they have.

¹⁵ Our results cannot confirm the finding that self-employment creates work–home–conflict, e.g. by decreasing family satisfaction (this was found by Parasuraman and Simmers 2001); while the coefficient for family satisfaction is negative in our sample as well, in most cases it is not statistically significant.

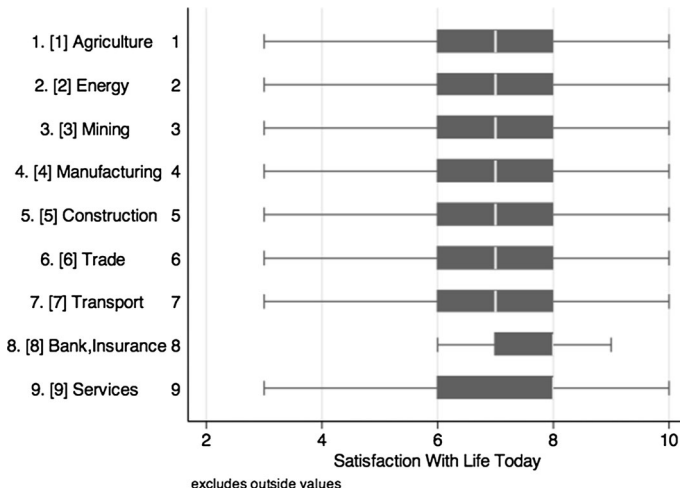


Fig. 1 Box plot of life satisfaction by 1-digit industry type

Company size for employed and self-employed individuals is available in our data set and offers a coarse division into the size categories of less than 20 core employees (our control category), 20 to 200, 200 to 2000 and more than 2000 employees. There is also the category of being self-employed with no other employees. The SOEP further contains 1 digit industry codes for individuals that are working, ranging from Agriculture to the Service industry (the latter of which we use as base category).

As a first orientation, we present box plots of life satisfaction for our sample group by industry type (on the one digit level, see Fig. 1), by autonomy categorization (see Fig. 2) as well as by company size (Fig. 3). These box plots reveal few systematic life satisfaction differences for industry type with the exception of higher median life satisfaction in Banking/Insurance and Service industries. They also reveal higher median life satisfaction for the two highest autonomy categories (and somewhat surprisingly for the lowest, i.e. apprenticeship). In these raw data, we also find that median life satisfaction is highest in extremely big companies.

We have thus repeated our multivariate regression for life and work satisfaction and added the three variables as further control variables. The results are depicted in Table 6, where we only report the coefficients for company size (company size of less than 20 employees is the omitted reference category), autonomy (we use lowest autonomy level as baseline category, instead of the apprentice category) and industry type (with “Services” as omitted baseline category). For industry types, we find no effect on life satisfaction and only few industries relate negatively to work satisfaction (as compared to the control group of Services), namely manufacturing, construction and trade. With the other two variables, we find clear associations for both work and life satisfaction. Higher autonomy is beneficial for both work and life satisfaction, increasing with autonomy level (thus providing evidence for our autonomy hypothesis (H3)). Interestingly, compared to the low autonomy level reference category, we find a positive impact of apprenticeship for life satisfaction. With company size, we find positive coefficients also for both life and work satisfaction for medium and large companies. These findings are surprising as a reverse relationship is usually found in the literature (e.g., Benz and Frey 2008a; Idson 1990): it is typically

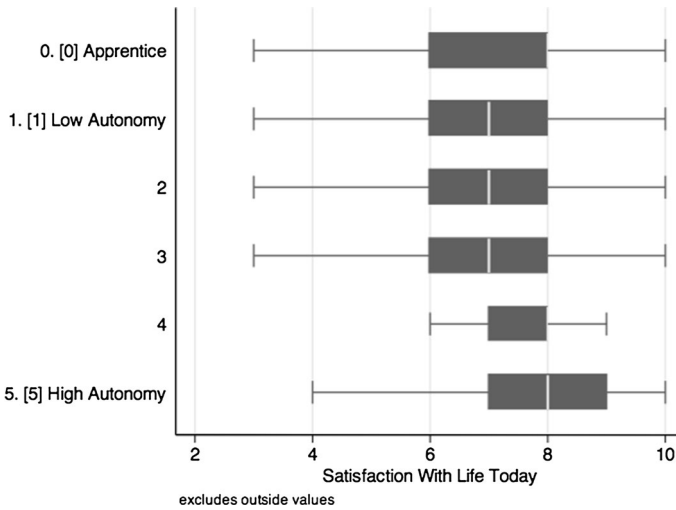


Fig. 2 Box plot of life satisfaction by level of autonomy

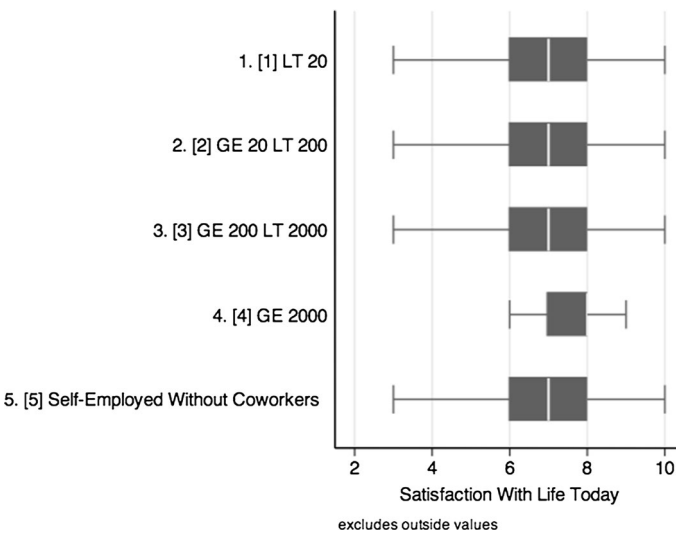


Fig. 3 Box plot of life satisfaction by company size

argued that smaller companies offer better working conditions and more autonomy to their employees than larger companies, thus leading to higher work satisfaction for employees in smaller firms. Why this is not the case here warrants further research (the effect is not driven by the self-employed but persists when redoing the regressions only for employed individuals).

Finally, note that life satisfaction is negatively impacted for those individuals who are self-employed with no coworkers, maybe because these also represent necessity self-employment. Alternatively, a driver of well-being for the self-employed (beside autonomy) is being in charge of a company. The latter has been already observed in the literature

Table 6 FE regressions with company size, autonomy and industry type dummies

	Life satisfaction (FE)		Job satisfaction (FE)	
Industry dummies (services as omitted baseline category)				
Agriculture	-0.0598	(-0.82)	0.0773	(0.65)
Energy	-0.0950	(-1.31)	0.0081	(0.06)
Mining	0.0396	(0.29)	-0.1610	(-0.71)
Manufacturing	0.0480	(1.69)	-0.1105*	(-2.47)
Construction	0.0174	(0.57)	-0.1345**	(-2.91)
Trade	-0.0102	(-0.30)	-0.1986***	(-3.92)
Transport	-0.0517	(-1.12)	-0.0802	(-1.19)
Bank, insurance	0.0279	(0.41)	0.0304	(0.37)
Autonomy dummies (low autonomy (level 1) as baseline)				
Apprentice	0.1775*	(1.97)	0.1642	(1.02)
Low autonomy (level 2)	0.0525*	(2.02)	0.1341***	(3.59)
3	0.1500***	(4.97)	0.3057***	(7.04)
4	0.1975***	(5.82)	0.4517***	(9.27)
High autonomy (level 5)	0.2507***	(5.64)	0.5948***	(9.49)
Company size dummies (LT 20 employees as baseline)				
GE 20 LT 200	0.0453*	(2.00)	0.0638	(1.81)
GE 200 LT 2000	0.0816**	(3.10)	0.1691***	(4.00)
GE 2000	0.1229***	(4.37)	0.2193***	(4.93)
Self-employed without coworkers	-0.1003*	(-2.27)	0.0279	(0.47)
<i>N</i>	104,338		103,139	
<i>R</i> ²	0.077		0.047	
<i>F</i>	81.2399		34.4777	
<i>df</i> _r	19,912		19,799	

Other control variables as in main FE regressions but not displayed here. We use a fixed-effects regression framework with life satisfaction (column 1) and job satisfaction (column 2) as dependent variables. We use robust standard errors clustered on the individual. Time and regional dummies are used but not reported *t* statistics in parentheses

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

(Blanchflower 2004, pp. 55–57) and might also account for the heterogeneous results regarding the life satisfaction self-employment relationship.

We have also used the three named variables as matching covariates for the opportunity case (industry, autonomy and company size obviously only apply to the case where individuals start out employed). Including the three variables as additional covariates leads to rather similar results, which we do not report here to conserve space. Apart from these further analyses, we have also conducted the usual robustness checks that the matching technique allows (Caliendo and Kopeinig 2008). Visual inspection of kernel density plots for the propensity scores show sufficient overlap, and formal calculations of bias reduction show that matching indeed has reduced bias between control and treatment group covariates (typically, less than 10 % bias is deemed acceptable and this was achieved for most of our covariates, see D'Agostino 1998).¹⁶

¹⁶ We are happy to provide these more detailed diagnostic analyses on request.

4 Conclusion

Becoming self-employed is a transformative life event that has an impact on the well-being of the self-employed. While it is well-known in the entrepreneurship literature that self-employment positively influences job satisfaction, the effects on overall life satisfaction as well as on satisfaction in different life domains have been less clear. Our study contributed to a better understanding of the welfare effects of self-employment apart from its monetary aspects.

For our German sample, we have found that voluntary (“opportunity”) self-employment brings with it positive benefits apart from work satisfaction, and leads to higher overall life satisfaction as well as increased health satisfaction, all of which increase in the first 3 years of self-employment. Being forced into (“necessity”) self-employment to escape unemployment, however, confers no such benefits. Even more so, necessity self-employment leads to increasing dissatisfaction with one’s leisure time, an effect that also pertains to a lesser degree to the opportunity self-employed. Our study thus confirms findings for Great Britain (Binder and Coad 2013) and in some parts also confirms results for a study of the same German sample (the discrepancies in results here might be due to different measurement methodologies and warrant further research; compare Benz and Frey 2008a).

Overall, it seems that self-employment only enhances the well-being of the self-employed if it is chosen voluntarily and thus satisfies an individual’s need for autonomy (Deci and Ryan 2000). This is not to say that self-employment cannot be a valid alternative to unemployment and thus be promoted by policy-makers. In these cases, however, where the unemployed are prodded and coaxed into (necessity) self-employment, we should not expect that they are happier with this than a comparison group of regular employees. Self-employment might be a route to escape unemployment, but policy-makers should be aware that at least some of the benefits of self-employment will not be reaped by those going into it out of necessity.

Further research should explore whether the findings from UK/Germany can also be reproduced in other countries, especially those where self-employment is more prevalent. It would also be interesting to see whether there are anticipation effects on work and life satisfaction before transitioning into self-employment and whether these account for most of the positive effect that SE can have on satisfaction (compare Hanglberger and Merz 2011). And finally, teasing apart the heterogeneity of self-employed in a more precise fashion would be a desirable next step of analysis left for further study.

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Appendix

See Table 7.

Table 7 Contemporaneous correlations

	Life satisfaction	Work satisfaction	d_employed	d_selfemployed	d_unemployed	Log(income)	d_disabled	Gender	Age	Subj. health
Life satisfaction	1.0000									
Work satisfaction	0.4552*** (0.0000)	1.0000								
d_employed	0.0565*** (0.0000)	0.0629*** (0.0000)	1.0000							
d_selfemployed	0.0139*** (0.0000)	0.0461*** (0.0000)	-0.1638*** (0.0000)	1.0000						
d_unemployed	-0.1360*** (0.0000)	-0.2353*** (0.0000)	-0.3310*** (0.0000)	-0.0969*** (0.0000)	1.0000					
log(income)	0.2146*** (0.0000)	0.1362*** (0.0000)	0.1835*** (0.0000)	0.1883*** (0.0000)	-0.1745*** (0.0000)	1.0000				
d_disabled	-0.1561*** (0.0000)	-0.0792*** (0.0000)	-0.1395*** (0.0000)	-0.0529*** (0.0000)	0.1416*** (0.0000)	-0.0591*** (0.0000)	1.0000			
Gender	0.0022 (0.2600)	-0.0100*** (0.0001)	-0.2779*** (0.0000)	-0.1094*** (0.0000)	0.1042*** (0.0000)	-0.0659*** (0.0000)	-0.0413*** (0.0000)	1.0000		
Age	-0.0576*** (0.0000)	-0.0556*** (0.0000)	-0.2539*** (0.0000)	-0.0156*** (0.0000)	0.0705*** (0.0000)	-0.0060** (0.0019)	0.2761*** (0.0000)	0.0157*** (0.0000)	1.0000	
Subj. health	0.4247*** (0.0000)	0.3000*** (0.0000)	0.1566*** (0.0000)	0.0510*** (0.0000)	-0.1370*** (0.0000)	0.1349*** (0.0000)	-0.3613*** (0.0000)	-0.0470*** (0.0000)	-0.4091*** (0.0000)	1.0000
Observations	270,094									

p values in parentheses

* *p* < 0.05; ** *p* < 0.01; *** *p* < 0.001

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