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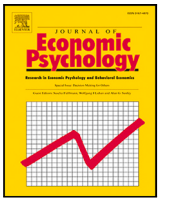

# Entrepreneurial worries: Self-employment and potential loss of well-being☆

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ABSTRACT

The relationship between self-employment and life satisfaction has been shown to be heterogeneous in the literature. This paper analyzes a channel through which lower well-being can come about for the self-employed, namely, their worries about their business ("entrepreneurial worries"). Using a two-way fixed effects estimator on German panel data (1984–2020), I find no overall effect of becoming self-employed on life satisfaction, and heterogeneity analysis shows that only those self-employed individuals who change from unemployment to self-employment report higher life satisfaction. Mediation analysis reveals that worries about one's financial situation (and, to some extent, job security) mediate the relationship between self-employment and life satisfaction. Life satisfaction decreases as self-employed individuals worry more about their financial situation as a result of becoming self-employed. Only if one does not worry about one's financial situation at all does self-employment contribute positively to life satisfaction.

## 1. Introduction

When thinking of entrepreneurship, we tend to think of superstar entrepreneurs such as Steve Jobs or Oprah Winfrey and the multibillion dollar enterprises they have built. Add to this the idea of being your own boss, working with high degrees of freedom and autonomy, and creating innovations that deeply transform society, and it is no surprise that individuals dream of becoming self-employed (Blanchflower, 2004). However, the reality of self-employment can be much more mundane for many self-employed individuals, if not outright bleak: on average, the self-employed report longer working hours (Hyytinen & Ruuskanen, 2007), more stress and uncertainty (Cardon & Patel, 2015; Patzelt & Shepherd, 2011), more dissatisfaction with job (in)security (Georgellis & Yusuf, 2016; Millán, Hessels, Thurik, & Aguado, 2013) and often even lower incomes than their employed counterparts (Hamilton, 2000). And if you start your business from scratch, chances are you will not see it thrive, as most (small) business ventures quite quickly fail instead of becoming big enterprises (Nightingale & Coad, 2013).

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And yet, most of the self-employed are more satisfied with their work than comparably employed individuals are (e.g., Benz & Frey, 2008a; Blanchflower, 2004). But the evidence for a positive relationship between self-employment and life satisfaction (as a measure of one's overall well-being) is much weaker and more mixed, ranging from positive to negative to no effects (for an overview, see Binder & Blankenberg, 2021; Stephan, 2018; Stephan, Rauch, & Hatak, 2023). Findings here depend on sample, time horizon, type of self-employment and what measure of well-being one looks at; this holds specifically for the dataset used in this study (compare Binder & Coad, 2016; Hetschko, 2016; Odermatt, Powdthavee, & Stutzer, 2021; van der Zwan, Hessels, & Rietveld, 2018). Types of self-employment, especially whether one voluntarily becomes self-employed or becomes self-employed out of necessity to escape unemployment, and the heterogeneity of objective characteristics of self-employment have been proposed as explanations for these mixed findings (Binder, 2018; Binder & Coad, 2013; Stephan et al., 2023; Williams, Broughhton, Meager, Spiegelhalter, Johal et al., 2017).

But it is not only heterogeneity in objective conditions of the self-employment experience that could matter for how self-employment translates into well-being, but also heterogeneity with regard to how individuals react (subjectively) to those conditions. The attributes of the individual, such as motivations, personality traits or resilience (Baron, Franklin, & Hmieleski, 2016) can explain why two individuals experience the same type of self-employment differently. Such subjective factors shape how the self-employed respond to the various job demands of their ventures (Karasek, 1979; Luchman & González-Morales, 2013) and have even been found to be more strongly related to an entrepreneur's well-being than objective conditions (see Stephan, 2018, p. 303). It is to this stream of research that the present paper contributes.

In this article, I focus on self-employed business owners in Germany ("everyday entrepreneurs" if you will; Welter, Baker, Audretsch, & Gartner, 2017) and their "entrepreneurial worries". Entrepreneurial worries can be seen as a type of stressor that the self-employed encounter and they encompass both worries about one's financial situation resulting from becoming self-employed and worries about one's job security during the self-employment experience. I analyze how becoming self-employed can increase such entrepreneurial worries and how this increase in worries mediates the impact of becoming self-employed on overall satisfaction with life. By focusing on worries as mediators of the self-employment and life satisfaction relationship, I take into account that not only does a person's objective situation impact on their well-being (finances are tight, one might expect to go out of business), but also the subjective perception and affective evaluation that individuals give to this situation vis-à-vis their aspirations attached to the situation (for example, how the self-employed mentally account for different taxes influences their perception of their business, see Olsen, Kasper, Kogler, Muehlbacher, & Kirchler, 2019). To the best of my knowledge, the mediation relationship between self-employment, worries and life satisfaction has not yet been researched.

Using over 30 years of panel data (1984–2020) with a two-way fixed effects estimator, I find no evidence for a change in life satisfaction following the change to self-employment, even though such a change increases job satisfaction. Heterogeneity analysis, where I unpack self-employment into "opportunity-based" and "necessity-based" self-employment, reveals that only those who change from unemployment to self-employment report higher life satisfaction (but the increase in life satisfaction when going from unemployment to paid employment is even greater). I can show that worries about one's financial situation (and to some extent also worries about job security) mediate the relationship between self-employment and life satisfaction. Life satisfaction decreases as self-employed individuals worry more about their financial security when they become self-employed. Only if individuals state that they do not worry about their financial situation at all does self-employment contribute positively to their life satisfaction.

The paper is structured as follows: Section 2 provides a short literature background on what is known about the relationships among self-employment, worries and subjective well-being. In Section 3, I proceed by describing my econometric approach, describing the data set and variables used, and providing an initial descriptive analysis. The main analysis and mediation model are presented in Section 4, and a heterogeneity analysis is presented in Section 5. Section 6 concludes.

## 2. Literature background

Well-being, in addition to financial gains, has gained a place on the list of "success" or "performance indicators" of self-employment (e.g. Baron et al., 2016, p. 746). Research shows that one common factor that most self-employed individuals share is their greater level of job satisfaction compared to their employed counterparts (e.g. Blanchflower, 2004, p. 52), likely due to being one's own boss and enjoying a high degree of autonomy (Benz & Frey, 2008a, 2008b; Coad & Binder, 2014; Lange, 2012).

But job satisfaction is a very narrow and specific measure of well-being. As soon as we extend our focus to a more global life satisfaction measure, the relationship becomes less clear, and evidence becomes much more mixed (Binder & Blankenberg, 2021; Dolan, Peasgood, & White, 2008; Stephan et al., 2023). Some studies find a positive relationship; for example, Blanchflower and Oswald (1998) and Alesina, Di Tella, and MacCulloch (2004) report for cross-sectional data from the U.S. that some groups of self-employed are happier than their employed peers. In a similar vein, Craig, Schaper, and Dibrell (2007) provide some evidence for a positive relationship from Australian small businesses. Schjoedt and Shaver (2007), on the other hand, find no evidence for higher life satisfaction among nascent entrepreneurs in their U.S. sample. Looking at European countries, Blanchflower (2004) also fails to find overly strong effects of self-employment on life satisfaction: self-employment is significantly related to life satisfaction only for subgroups and strongly depends on the dataset used. For the German SOEP dataset, which is also used in the present article, Binder and Coad (2016) find a negative coefficient for the full sample and a positive impact only for opportunity self-employed, i.e., those who pursue self-employment voluntarily to pursue some entrepreneurial opportunity (compare, similarly, van der Zwan et al., 2018). For the same dataset but with a different time horizon, Odermatt et al. (2021) find a positive association for the subsample of individuals going into self-employment for the first time in their employment history. Hetschko (2016) further

reports that exiting self-employment has a more negative effect on life satisfaction than does losing one's normal job and that any positive effect of self-employment on life satisfaction is moderated by one's subjectively assessed probability of losing one's job.

In sum, the empirical evidence concerning the relationship between self-employment and life satisfaction is rather heterogeneous (Andersson, 2008; Harbi & Grolleau, 2012, p. 231), despite a growing number of studies focusing on it (Stephan et al., 2023), and does not allow for an unambiguous overall prediction. On the basis of my reading of the literature, the only consistently positive relationship holds for opportunity self-employed. I thus only hypothesize that

**Hypothesis 1.** Becoming "opportunity" self-employed will lead to an increase in life satisfaction.

As a corollary to Hypothesis 1 (but not the main interest of this paper), the literature is clear that becoming self-employed increases job satisfaction so that I would expect a positive change in job satisfaction to result from becoming self-employed (here: regardless of type).

Given such heterogeneous findings in the literature, one needs to ask what can drive the conflicting results on the relationship between self-employment and life satisfaction. A likely source is the heterogeneous nature of different types of self-employment. But not only objective conditions such as type of work (Binder, 2018; Williams et al., 2017), earnings potential (Hamilton, 2000), working hours (Hyytinen & Ruuskanen, 2007) or work-life conflicts (Binder & Coad, 2016; van der Zwan et al., 2018) may explain differences in life satisfaction. The subjective, psychological experience of an individual, including individual motivations (Fuchs-Schündeln, 2009), stress (Lerman, Munyon, & Williams, 2021; Wach, Stephan, Weinberger, & Wegge, 2021), or personality traits (Baron et al., 2016; Caliendo & Kritikos, 2012; Lange, 2012), helps explain the self-selection into self-employment and the differences in life satisfaction (Berglund, Johansson, & Strandh, 2015; Lerman et al., 2021). The "job demands-control(-support) model" (JCDS; Karasek, 1979; Luchman & González-Morales, 2013) here argues that it is the relationship between the (objective) demands of the specific type of self-employment in relation to the (subjective) experienced levels of control and support the individual has that decides whether factors such as greater complexity, uncertainty, or longer working hours, translate into work-related stress and negatively impact well-being (Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010; Obschonka & Silbereisen, 2015).

Interestingly, subjective factors can have stronger negative associations with well-being than objective factors do: Baron et al. (2016) explore how "psychological capital" mediates the negative impact of stress on life satisfaction for their sample of U.S. entrepreneurs and show that such individual characteristics have a stronger impact on life satisfaction than does the financial performance of the business venture. This is in line with a number of other studies surveyed in Stephan (2018), where the subjective perception of a situation seems to be more relevant to entrepreneurial mental health than the objective condition itself: for example, increasing funding for an entrepreneurial venture might come with additional stress, demands on the entrepreneur's confidence and skills and hence an objectively positive event might be perceived as threatening and negative by some entrepreneurs (Berge, Bjorvatn, & Tungodden, 2015; Bhuiyan & Ivlevs, 2019; Karlan & Zinman, 2011).

The focus of the present paper will therefore be on subjective perceptions of the business, namely, worries that result from becoming self-employed. Worries can be understood as individuals' negative expectations about some concrete domain (one's health, job, etc.) with respect to a desired reference level (Boehnke, Schwartz, Stromberg, & Sagiv, 1998; Luhmann, Crayen, & Eid, 2010; Schwartz, Sagiv, & Boehnke, 2000). They also have an affective dimension (related to anxiety) and hence are often categorized as subitems in measurement scales for anxiety. While the early psychological literature tended to view worries as a (pathological) subjective expression of anxiety, recent research has shown them to be distinct from anxiety, including a conscious cognitive evaluation component (see more extensively Boehnke et al., 1998; Schwartz et al., 2000). Worries are related to stress and the loss or lack of personal resources (cf. Hobfoll, 2001), but they constitute a distinct mental construct. They are also related to the notion of "affective rumination" (e.g., Querstret & Cropley, 2012) in that both refer to thinking about the job while off the job, hence not being able to recover from work stress and work demands (Wach et al., 2021). However, rumination is characterized by thoughts regarding past and present issues, whereas worries are directed to the future (Rohrer, Brümmer, Schupp, & Wagner, 2021, p. 21).

The literature on worries further distinguishes between micro- and macro-worries (Boehnke et al., 1998), where micro-worries relate to the person worrying about themselves (or someone close) and macro-worries relate to more general objects such as the environment or world peace. Worrying is negatively related to mental health in those studies, and micro-worries are often negatively related to subjective well-being, whereas no relationship or a positive relationship is found for macro-worries (Boehnke et al., 1998; Luhmann et al., 2010). This is in line with the interpretation that micro-worries are self-interested, whereas macro-worries are more altruistic: self-interested concerns about own income and job security have also been found to be negatively related to well-being, whereas altruistic concerns about peace and the environment have been found to positively influence subjective well-being in the German Socio-Economic Panel dataset (Binder & Blankenberg, 2016; Luhmann et al., 2010; Rohrer et al., 2021). Considering the nature of worries, it is no surprise that personality traits such as neuroticism are good predictors of increased worrying, whereas objective conditions such as income are only good predictors of micro-worries (Luhmann et al., 2010).

There is only scant evidence on the relationship between self-employment and worries: Lockey (2018, p. 47) finds that the self-employed in the UK have a number of recurring worries regarding the irregularity of their income, not being able to find sufficient contract work and so on, but the study does not relate these worries to well-being (compare also Block, Kritikos, Priem, & Stiel, 2022, on how a lack of speedy payouts from a crisis intervention program seemed to increase the stress of the self-employed during the COVID crisis in Germany). Somewhat more remotely related to this article, Bhuiyan and Ivlevs (2019) do not find a link between microcredit and life satisfaction for their Bangladeshi cross-section but are able to find a statistically significant link between microcredit and an unspecific feeling of worry. The latter, in turn, is negatively related to life satisfaction. Off-work thoughts about

work are related to lower job satisfaction in a sample of Swedish entrepreneurs (Thorgren, Wincent, & Sirén, 2013) and to lower well-being in a diary study of German self-employed individuals (Wach et al., 2021). That worries are relevant for well-being is also analyzed outside of the entrepreneurial domain, where for instance, worries are shown to mediate the effect of income inequality on life satisfaction (Roth, Hahn, & Spinath, 2017). In addition, indirectly concerning job security worry, related work finds that the self-employed seem to be more dissatisfied with their job security (Georgellis & Yusuf, 2016; Millán et al., 2013).

On the basis of the literature developed thus far, the present paper aims to shed more light on the subjective perceptions that self-employment evokes and their effect on individuals' satisfaction with life. I operationalize this with individuals' subjective evaluations of their business future, namely worries about financial situation and job security, which I call "entrepreneurial worries". More specifically, I hypothesize the following:

**Hypothesis 2a.** Becoming self-employed increases "entrepreneurial worries" about one's financial situation.

**Hypothesis 2b.** Becoming self-employed increases "entrepreneurial worries" about one's job security.

In addition, I propose the key contribution of this paper in hypothesizing that "entrepreneurial worries" are one channel that can explain under what conditions self-employment can be detrimental to life satisfaction, viz. when the self-employed find themselves worrying about their financial situation as a result of their choice of becoming self-employed. More specifically:

**Hypothesis 3.** "Entrepreneurial worries" are mediators in the relationship between self-employment and life satisfaction and greater worries will decrease life satisfaction.

## 3. Methodology and data

### 3.1. Econometric strategy

To test the hypotheses outlined in the previous section, I employ a two-way fixed effect ordinary least squares regression model (TWFE OLS), which controls for both individual-specific unobserved heterogeneity and time fixed effects. The main dependent variable, life satisfaction, is measured on an 11-point, endpoint-labeled numerical response scale, where values have a natural ordering but do not necessarily presuppose a cardinal interpretation, and would hence best be modeled via ordinal regression. However, it has been shown in countless applications that ordered probit models return qualitatively similar results to (cardinal) OLS models in well-being research. OLS has proven to be quite robust in the literature, both because the anchoring of the questions induces some linearity in response styles as well as their technical robustness regarding deviations from the related linearity assumption (for this, see, e.g., Ferrer-i Carbonell & Frijters, 2004; van Praag, 1991). Owing to the advantage of being able to control for all types of unobserved time-invariant confounders with the within transformation of FE OLS, along with ease of interpreting OLS coefficients, I follow the practice in the literature of treating my satisfaction variables as cardinal. To test Hypothesis 1, my general regression equation thus takes the form

$$LS_{i,t} = \beta SE_{i,t} + \boldsymbol{\gamma}\mathbf{Z}_{i,t} + \alpha_i + \lambda_t + \epsilon_{i,t}, \tag{1}$$

where $LS_{i,t}$ denotes the dependent variable life satisfaction, $SE_{i,t}$ is the self-employment dummy variable, $\mathbf{Z}_{i,t}$ the vector of control variables, $\alpha_i$ represents individual-specific time-invariant fixed effects, $\lambda_t$ period dummies, and $\epsilon_{i,t}$ is the idiosyncratic error term, purged of the afore-listed time and person fixed effects (hence the "two-way" fixed effects moniker). I use heteroscedasticity-robust standard-errors clustered at the individual level to further account for intraperson correlation of otherwise not directly modeled disturbances.

The fixed effects ("within") estimator does not compare levels of well-being between individuals with different job statuses but compares average pre- and postchange well-being after a job change into self-employment of the same individual, i.e. treated individuals themselves act as their own control (Allison, 2009, p. 1). This means that in simple one-way fixed effects estimation, only individuals with such changes in job status are used in the estimation of the coefficients, and other panel members do not contribute (e.g., individuals in the dataset with only one observation per person, or those who are always or never self-employed). Where an individual is observed multiple periods before and after the change, the fixed effects regression coefficient then captures the difference in average levels of well-being before and after the job change (it captures the change in well-being, albeit not narrowly constrained to the year of the job change). As I am interested in the well-being consequences of becoming self-employed, I limit the dataset to individuals' changes into self-employment and I remove subsequent exits out of self-employment from the estimation.

To account for potential age and period effects via time dummies, I do not use a simple FE estimator but rather the TWFE estimator (within estimation with control group). In this case, the inclusion of a suitable control group becomes necessary to allow better estimation of time trends and age effects (which also increases the precision of the estimates). This use of a control group creates the danger of introducing heterogeneity into the estimates by choosing individuals for the control group that are too dissimilar to the treated individuals. For this reason, it makes sense to limit the control group to individuals who would resemble the treated individuals. This means that I will discard from the control group any individuals who have experienced self-employment episodes and consider only individuals who could but have not become self-employed (see, similarly, Odermatt et al., 2021).

Assuming that there are parallel trends between the treatment and control groups (hence the focus of selecting similar individuals into the control group) and that all relevant time-varying confounders are controlled for, that past outcomes may not influence treatment selection, and that lagged treatments may not influence current outcomes, the TWFE estimator yields a causal average effect on the treated (ATT; cf. more extensively Allison, 2009; Bruederl, 2010; Hill, Davis, & Roos, 2020).

To test Hypothesis 2 (increase in entrepreneurial worries following an individual's move into self-employment), I estimate the following model:

$$\text{Worry}_{i,t} = \beta SE_{i,t} + \boldsymbol{\gamma}\mathbf{Z}_{i,t} + \alpha_i + \lambda_t + \epsilon_{i,t}. \tag{2}$$

The choice of employing fixed effects OLS regressions becomes slightly less defensible here since the dependent variables are measured on a 3-point scale, but it serves to maintain comparability of the regression coefficients with the mediation models (see below) and to use the panel structure of the SOEP dataset.

Finally, to more formally analyze the mediation hypothesis that worries are a channel through which self-employment impacts life satisfaction, I adopt the mediation approach of Preacher and Hayes (2008) and Hayes (2009), which is based on the work of Baron and Kenny (1986). This approach decomposes a "total effect" of self-employment on satisfaction (as in Eq. (1)) into a direct effect and an indirect effect that goes through worries. While the Baron and Kenny method is widely used in social science research, concerns have been raised about it in the literature (e.g. Bullock & Ha, 2011; Rucker, Preacher, Tormala, & Petty, 2011; Zhao, Lynch, & Chen, 2010), and best practice has shifted over the last few years (Gatignon, 2014; Hayes, 2009; Preacher & Hayes, 2008, ch. 11) to jointly estimate the following two regression equations,

$$Worry_i = \alpha_i + \beta_i SE + \gamma_i Z + \epsilon_{i,Worry} \tag{3}$$

$$LS_i = \alpha_i + \beta_i' SE + \delta_i Worry + \gamma_i Z + \epsilon_{i,LS}, \tag{4}$$

where $\alpha$ denotes the constant, $\beta$ is the coefficient for the self-employment dummy, $\beta'$ the "direct effect" coefficient self-employment while controlling for the worry mediator, $\delta$ the coefficient of the mediator variable worries and $\gamma$ a vector of coefficients of control variables. Eq. (3) regresses the mediator variable (worries) on self-employment, and Eq. (4) then regresses the satisfaction variable on both the mediator and self-employment variables. From this system of equations, an indirect effect of self-employment on satisfaction through worries can be computed as $\partial LS/\partial Worry * \partial Worry/\partial SE$, i.e., $\beta_i * \delta_i$.

Note that Eqs. (3) and (4) correspond to cross-sectional versions of Eqs. (1) and (2). The error terms of both equations are likely to be correlated because of omitted common factors, including other mediators (Bullock & Ha, 2011). This implies that the independently estimated OLS coefficients will be biased. In addition, the coefficients that constitute the indirect effect are not independently distributed, and their distribution is not normal (Preacher & Hayes, 2008; Zhao et al., 2010, p. 880). To account for correlated errors across equations, one needs to estimate the two key equations representing the mediation process as a (recursive) system of equations via Seemingly Unrelated Regressions (SUR, a method equivalent to a type of structural equation model widely used outside of economics; see Zellner, 1962). Following (Preacher & Hayes, 2008) and Hayes (2009), I bootstrap the standard error of the coefficient for the indirect effect so that a normal distribution of the indirect effect's test statistic is not needed. Unfortunately, however, a SUR estimator with fixed effects has not yet been developed. This means that to estimate the indirect effect of self-employment on life satisfaction through worries, I am forced to employ a cross-sectional approach and depart from the within model preferred for the individual equations. One could estimate the SUR system of equations after performing a within transformation of variables, but the inferential part of such an estimator (read: computation of correct standard errors) is still unclear and not understood (Wooldridge, 2022). Random-effects estimation of SUR exists but does not have the desirable feature of FE estimators of making X independent of time-invariant unobserved factors, so that their advantage with regard to identification over a simple cross-sectional regression is no longer clear.

For the cross-sectional mediation approach, I do not use the panel dataset as a pooled cross-section to avoid counting the same individual multiple times. Since I count only the first instance of an individual becoming self-employed for the fixed effects regressions above, I similarly construct the treatment group now by focusing on the year an individual first moves into self-employment. A control group is constructed similarly to the approach above; however, I only use individuals once and here count the individual's first "non-change", i.e., the first episode where the individual stays employed full-time. By this I get a large "cross-section" that contains all individuals who are in the panel data set at different points in time and their first (non-)change as described.

### 3.2. Dataset and variable description

I use the well-known German Socio-Economic Panel (SOEP) dataset, version v37, 1984–2020, which is the longest-running survey of private households in Germany. The data collection started in 1984 with the West-German population, but an East-German sample was added in 1990, aiming at the collection of a representative micro-dataset (since 1992, there has been only one questionnaire for both parts of Germany). The first wave included interviews with 6000 households selected via multistage random sampling to reflect a representative selection of the German populace. In 2007, the number had increased to approximately 12,000 households, encompassing more than 20,000 individuals (for more information see Haisken-DeNew & Frick, 2005; Wagner, Frick, & Schupp, 2007). While the full dataset has over 600,000 valid person-year observations on life satisfaction and (self-)employment status, after the panel is cleaned and the focus is on full-time self-employed, this number decreases considerably. Table 1 summarizes the main

**Table 1**
Summary statistics. Pooled over the sample horizon. Full sample (1) vs. main estimation sample of full-time first-time self-employment (2).
*Source:* SOEP v37, waves 1–37 (1984–2020).

| | (1) Sample | | | (2) First-time full-time SE | | |
|---|---|---|---|---|---|---|
| | mean | sd | count | mean | sd | count |
| **Dependent variables** | | | | | | |
| Life satisfaction | 7.16 | 1.78 | 609,707 | 7.05 | 1.65 | 8033 |
| Job satisfaction | 7.09 | 2.10 | 423,683 | 7.40 | 1.88 | 7947 |
| **Independent variables** | | | | | | |
| Self-employed (full-time, %) | 0.02 | | 463,522 | | | 8052 |
| Opportunity-SE (full-time, %) | 0.01 | | 405,022 | | | 5756 |
| Necessity-SE (full-time, %) | 0.01 | | 126,957 | | | 1190 |
| **Mediator variables** | | | | | | |
| Worries: Economic Development | 1.12 | 0.65 | 586,717 | 1.20 | 0.65 | 8002 |
| No worries (%) | 0.16 | | 586,717 | 0.13 | | 8002 |
| Some worries (%) | 0.57 | | 586,717 | 0.54 | | 8002 |
| Big worries (%) | 0.28 | | 586,717 | 0.33 | | 8002 |
| Worries: Own Finances | 0.92 | 0.70 | 610,442 | 0.96 | 0.67 | 8026 |
| No worries (%) | 0.29 | | 610,442 | 0.25 | | 8026 |
| Some worries (%) | 0.50 | | 610,442 | 0.55 | | 8026 |
| Big worries (%) | 0.21 | | 610,442 | 0.20 | | 8026 |
| Worries: Job Security | 0.61 | 0.71 | 418,021 | 0.57 | 0.66 | 7309 |
| No worries (%) | 0.52 | | 418,021 | 0.53 | | 7309 |
| Some worries (%) | 0.34 | | 418,021 | 0.38 | | 7309 |
| Big worries (%) | 0.13 | | 418,021 | 0.09 | | 7309 |
| **Control variables** | | | | | | |
| *Education* | | | | | | |
| Primary (%) | 0.39 | | 585,632 | 0.26 | | 7956 |
| Secondary (%) | 0.41 | | 585,632 | 0.41 | | 7956 |
| Tertiary (%) | 0.20 | | 585,632 | 0.33 | | 7956 |
| *Family status* | | | | | | |
| Married (%) | 0.60 | | 616,465 | 0.67 | | 8020 |
| Single (%) | 0.28 | | 616,465 | 0.21 | | 8020 |
| Widowed (%) | 0.02 | | 616,465 | 0.01 | | 8020 |
| Divorced (%) | 0.07 | | 616,465 | 0.08 | | 8020 |
| Separated (%) | 0.03 | | 616,465 | 0.03 | | 8020 |
| *Household type* | | | | | | |
| Single (%) | 0.10 | | 620,752 | 0.13 | | 8052 |
| Couple (no kids, %) | 0.23 | | 620,752 | 0.22 | | 8052 |
| Single parent (%) | 0.08 | | 620,752 | 0.05 | | 8052 |
| Couple (kid below 16, %) | 0.27 | | 620,752 | 0.33 | | 8052 |
| Couple (kid over 16, %) | 0.17 | | 620,752 | 0.16 | | 8052 |
| Couple (kids boths ages, %) | 0.11 | | 620,752 | 0.08 | | 8052 |
| Multiple generations hh. (%) | 0.02 | | 620,752 | 0.02 | | 8052 |
| Other (%) | 0.02 | | 620,752 | 0.02 | | 8052 |
| *Other control variables* | | | | | | |
| Disability (%) | 0.08 | | 574,290 | 0.02 | | 7686 |
| Non-German nationality (%) | 0.16 | | 620,653 | 0.10 | | 8052 |
| Female (%) | 0.52 | | 620,739 | 0.27 | | 8052 |
| Age | 40.73 | 13.39 | 620,752 | 42.41 | 9.85 | 8052 |
| IHS(income), equiv. | 8.09 | 0.53 | 582,722 | 8.28 | 0.56 | 7405 |
| Neuroticism | 11.34 | 3.73 | 97,837 | 10.70 | 3.55 | 1190 |
| Extraversion | 14.78 | 3.45 | 97,731 | 15.29 | 3.29 | 1192 |
| Agreeableness | 16.20 | 2.93 | 97,785 | 15.84 | 2.86 | 1194 |
| Conscientiousness | 17.46 | 2.81 | 97,671 | 18.03 | 2.59 | 1194 |
| Openness | 13.85 | 3.57 | 97,189 | 14.47 | 3.42 | 1190 |

variables of interest used in the subsequent analysis (columns 1 and 2). With sample sizes in the thousands owing to the large-scale nature of the SOEP dataset, even small effect sizes, such as those detected in previous research (e.g., Odermatt et al., 2021) are detectable with high levels of statistical power (see Online Appendix, Section 1, for more detail).

The main dependent variable is life satisfaction. This question has been included in the survey since 1984 and asks how satisfied, all in all, the respondents are with their life at the moment (“today”). The answer is given on an ordinal Likert scale and is in the range from 0 (lowest satisfaction) to 10 (highest satisfaction). Subjective well-being measures are valid and reliable, with test-retest reliability between 0.5 and 0.7 (over two weeks, see Krueger & Schkade, 2008). The mean life satisfaction score is 7.16 (SD 1.78). I use an analogous job satisfaction measure for robustness checks. Mean job satisfaction is 7.09 (SD 2.10).

**Table 2**
Average degree of worry (0 = no worries, 2 = big worries) for employment, unemployment and self-employment (restricted to full-time working populace, when not unemployed). Pooled over the sample horizon.
*Source:* SOEP v37, waves 1–37 (1984–2020).

| | (1) Employed mean | (2) Unemployed mean | (3) First-time full-time SE mean |
|---|---|---|---|
| Worries: Economic Development | 1.10 | 1.27 | 1.20 |
| Worries: Own Finances | 0.88 | 1.39 | 0.96 |
| Worries: Job Security | 0.61 | 1.11 | 0.57 |

**Table 3**
Life satisfaction and worries of first-time full-time self-employed individuals. Pooled over the sample horizon.
*Source:* SOEP v37, waves 1–37 (1984–2020).

| | (1) Worry: Economic situation mean | (2) Worry: Own Finances mean | (3) Worry: Job security mean |
|---|---|---|---|
| No worries | 7.57 | 7.93 | 7.45 |
| Some Worries | 7.15 | 7.03 | 6.82 |
| Big Worries | 6.68 | 6.05 | 5.99 |
| Total | 7.05 | 7.05 | 7.07 |
| Observations | 7986 | 8010 | 7294 |

My main independent variable of interest is self-employment. Since I use fixed effects regressions, the focus of the analysis will be on individuals' moves from different employment categories into self-employment. To have a rather homogeneous treatment group, and in line with convention in the literature, I focus mostly on the self-employment of working-age individuals (aged 17–65), who become self-employed full-time. I exclude repeated self-employment episodes (and the attendant experience that "serial entrepreneurship" may entail) as well as part-time self-employment or self-employment after reaching retirement age, as these would constitute different types of self-employment. I also exclude a number of categories of self-employment, such as helping in a family business or being a farmer, which also have different consequences for well-being (on the difficulty of comparing these categories, see also Hundley, 2001, p. 299). Out of initially 8866 persons with 35,753 self-employment years, the fixed effects estimator uses as a treatment group only 2015 individuals with as many episodes of becoming self-employed of a total length of 8052 self-employment years. To assess whether heterogeneity of these types of self-employment matters, I also present robustness analyses where the treatment group is constructed more leniently.

To pursue the mediation hypothesis outlined above, I draw on variables that measure the different types of "worries" (or "concerns" as they are also called in the SOEP's data description). To capture different worries, respondents are asked to answer the following question: "How concerned are you about the following issues?" (The phrasing of the question varies minimally across the sample horizon, e.g., the use of "worries" and "concerns" is not uniform in the SOEP dataset, and I treat them as identical.) This is followed by different subject categories such as the economy in general, one's own financial situation, environmental protection, maintaining peace and job security. The variable for these different worries has been elicited continuously since 1984 and measured on a three point Likert scale ("Very concerned", "Somewhat concerned", "Not concerned at all", which I have recoded to 0 for no worries and 2 for being very concerned). I focus on two micro-worries, viz. worries about one's own financial situation (mean 0.92, SD 0.70, 29% are not concerned, 21% are very concerned) and job security (mean 0.61, SD 0.70, 52% are not concerned, 13% are very concerned). I add worries about the general economic development (mean 1.12, SD 0.65, 16% are not concerned, 28% are very concerned) as a comparison case (macro-worry).

In Table 2, I present average levels of worry by different types of employment status. We can see that worries about how the economy will develop are highest for unemployed individuals and lowest for regularly employed individuals. A similar picture emerges for financial worries and job security worries. Worries about the financial situation are less pronounced for employees than the self-employed. Being self-employed comes with less worrying about job security than being employed.

I also depict average life satisfaction by type of worry for first-time full-time self-employed individuals in Table 3, and we can see that life satisfaction markedly decreases with increasing worries about the economic situation, own finances and job security (nearly one point difference for worries about the economy and close to a massive two points regarding worries about one's own financial situation).

Finally, I use a number of control variables that could act as potential confounders when not included in the analysis (see Table 1 for details). These variables are the level of education (CASMIN scale), which ranges from zero ("in School") to nine ("higher tertiary education"), age, age$^2$/100, marriage status and household type, disability dummy and German nationality dummy. As some worries are driven by personality traits (especially neuroticism, Luhmann et al., 2010), I include measures of the Big Five personality traits (five factor model) as control variables in some of the models (Gosling, Rentfrow, & Swann, 2003). To date, a SOEP specific short Big Five inventory (BFI-S) has been elicited in three sample waves (in years 2005, 2009, and 2013) and this short 15-question inventory has been shown to have acceptable validity and reliability (for more info on this inventory, see Gerlitz & Schupp, 2005; Lang, John, Lüdtke, Schupp, & Wagner, 2011; Specht, Egloff, & Schmukle, 2011). The (cross-sectional) mediation models also specifically account

**Table 4**
Bivariate zero-order correlations (Pearson). Pooled over the sample horizon.
*Source:* SOEP v37, waves 1–37 (1984–2020).

| | Satisfaction with life | Satisfaction with job | Self-employed | Worries: Econ. Dev. | Worries: Own Finances | Worries: Job Security |
|---|---|---|---|---|---|---|
| Life satisfaction | 1.00 | | | | | |
| Job satisfaction | 0.44*** (0.000) | 1.00 | | | | |
| Self-employed (full-time) | −0.01*** (0.000) | 0.02*** (0.000) | 1.00 | | | |
| Worries: Economic Development | −0.17*** (0.000) | −0.11*** (0.000) | 0.02*** (0.000) | 1.00 | | |
| Worries: Own Finances | −0.36*** (0.000) | −0.25*** (0.000) | 0.01*** (0.000) | 0.40*** (0.000) | 1.00 | |
| Worries: Job Security | −0.24*** (0.000) | −0.23*** (0.000) | −0.01*** (0.000) | 0.28*** (0.000) | 0.50*** (0.000) | 1.00 |
| Observations | 621,558 | | | | | |

P-values in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

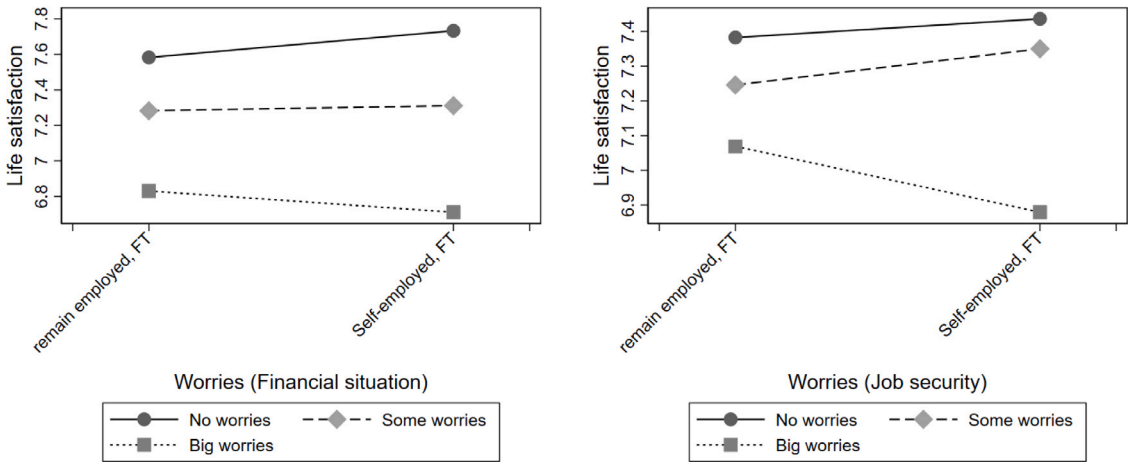


**Fig. 1.** Interaction effects for worries about one's own financial situation (left) and job security (right) and first-time full-time self-employment.
*Source:* SOEP v37, waves 1–37 (1984–2020).

for gender. All the models account for time spent in the panel (compare Chadi, 2013) and include controls for year effects and region (the 16 German Bundeslaender).

Table 4 shows bivariate zero-order (Pearson) correlation coefficients between the core variables of interest. Life and job satisfaction are linearly correlated ($r = 0.44, p < .001$). Self-employment is positively correlated with job satisfaction ($r = 0.02, p < .001$) and negatively correlated with satisfaction with life ($r = -0.01, p < .001$). All three worries correlate negatively with life satisfaction, although the two worries about one's own financial situation ($r = -0.36, p < .001$) and job security ($r = -0.24, p < .001$) do so more strongly than the general concern about the economy ($r = -0.17, p < .001$). While the three worries are more strongly correlated among themselves, none of the correlations suggest problems with severe multicollinearity. Lastly, while the parallel trends assumption is difficult to ascertain (as selection into treatment happens at different time periods during the time horizon), Fig. 1 in the Online Appendix depicts the overall trends in outcomes over the full sample horizon for the treatment and control group.

## 4. Multivariate analysis

My results consist of two parts: an overall analysis of the worries and life satisfaction of the self-employed (Table 5) and an analysis of the role that worries play in mediating the relationship between self-employment and life satisfaction (Tables 7 and 8).

**Table 5**
Fixed effects OLS regressions for life satisfaction and self-employment (Model 1). The second part of the table shows the relationship between worries and self-employment: Model (2) shows the effect of becoming self-employed on financial worries. Models (3) and (4) provide no evidence for similar increases in worries for job security (3) and economic situation worries (4). Model (5) repeats the analysis from Model (3) but adds personality trait variables as additional controls. The treatment group is restricted to full-time first-time self-employed. Region and year dummies present but not reported. Robust standard errors clustered at the individual level.
*Source:* SOEP v37, waves 1–37 (1984–2020).

| | DV: Life satisfaction | | DV: Worries | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) Life satisfaction | | (2) Worries: Own Finances | | (3) Worries: Job Security | | (4) Worries: Economic Situation | | (5) Financial Worries: Neuroticism control | |
| **Independent variables:** | | | | | | | | | | |
| Self-employed (full-time) | 0.06 | (1.80) | 0.03* | (2.04) | −0.01 | (−0.93) | −0.02 | (−1.41) | 0.10** | (2.73) |
| **Control variables:** | | | | | | | | | | |
| *Education* | | | | | | | | | | |
| Secondary | 0.00 | (0.06) | 0.02 | (0.99) | −0.03 | (−1.06) | 0.01 | (0.39) | 0.10 | (0.99) |
| Tertiary | 0.11* | (2.05) | −0.07** | (−3.13) | 0.01 | (0.43) | −0.02 | (−0.97) | 0.05 | (0.42) |
| *Family status* | | | | | | | | | | |
| Single | −0.10*** | (−4.69) | 0.01 | (1.53) | 0.04*** | (4.21) | 0.01 | (0.88) | 0.01 | (0.69) |
| Widowed | −0.15* | (−2.30) | −0.04 | (−1.74) | −0.06 | (−1.93) | −0.01 | (−0.47) | −0.14** | (−2.72) |
| Divorced | 0.04 | (1.40) | 0.03* | (2.31) | 0.04** | (2.72) | −0.00 | (−0.05) | 0.04 | (1.75) |
| Separated | −0.28*** | (−8.01) | 0.12*** | (10.03) | 0.01 | (1.02) | −0.00 | (−0.02) | 0.14*** | (5.11) |
| *Household type* | | | | | | | | | | |
| Couple (no kids) | 0.24*** | (10.91) | −0.02* | (−2.24) | 0.02* | (2.07) | 0.01 | (0.98) | −0.04* | (−2.14) |
| Single parent | −0.12*** | (−4.24) | 0.08*** | (7.55) | 0.08*** | (6.45) | −0.01 | (−1.55) | 0.02 | (0.94) |
| Couple (kid below 16) | 0.22*** | (9.88) | 0.01 | (0.67) | 0.03** | (2.84) | 0.00 | (0.10) | −0.01 | (−0.44) |
| Couple (kid over 16) | 0.12*** | (5.39) | 0.03** | (2.95) | 0.08*** | (7.56) | 0.01 | (1.43) | −0.01 | (−0.76) |
| Couple (kids boths ages) | 0.18*** | (7.55) | 0.01 | (1.35) | 0.06*** | (5.47) | 0.00 | (0.16) | −0.01 | (−0.31) |
| Multiple generations hh. | 0.03 | (0.85) | 0.01 | (0.74) | 0.09*** | (5.05) | 0.01 | (1.09) | −0.02 | (−0.48) |
| Other | −0.02 | (−0.60) | −0.01 | (−0.62) | 0.02 | (0.94) | −0.00 | (−0.30) | −0.09* | (−2.21) |
| *Other control variables* | | | | | | | | | | |
| Disability (y/n) | −0.31*** | (−13.65) | 0.04*** | (6.01) | 0.00 | (0.14) | 0.01 | (0.97) | 0.01 | (0.81) |
| Nationality: Not German | 0.11** | (2.67) | −0.04* | (−2.22) | 0.02 | (0.98) | −0.02 | (−1.51) | −0.04 | (−0.80) |
| Age | −0.06*** | (−4.12) | −0.01 | (−1.10) | 0.02*** | (3.30) | 0.23*** | (33.98) | −0.01* | (−2.12) |
| $Age^2$ | 0.03*** | (7.09) | −0.02*** | (−10.15) | −0.03*** | (−13.01) | −0.02*** | (−14.13) | −0.01** | (−2.58) |
| Agreeableness | | | | | | | | | 0.00 | (0.95) |
| Extraversion | | | | | | | | | −0.00 | (−1.57) |
| Openness | | | | | | | | | −0.00 | (−0.57) |
| Neuroticism | | | | | | | | | 0.02*** | (17.68) |
| Conscientiousness | | | | | | | | | −0.00 | (−1.42) |
| Constant | 9.60*** | (12.12) | 1.62*** | (4.68) | −0.06 | (−0.18) | −11.40*** | (−30.08) | 1.33*** | (6.55) |
| Region and year dummies | Yes | | Yes | | Yes | | Yes | | Yes | |
| Observations | 399,680 | | 400,731 | | 284,545 | | 394,014 | | 64,302 | |
| F-statistic | 46.85 | | 99.21 | | 79.87 | | 357.76 | | 47.32 | |
| Degrees of freedom | 62,826.00 | | 63,160.00 | | 50,110.00 | | 59,826.00 | | 32,752.00 | |
| Adjusted R-squared | 0.02 | | 0.03 | | 0.04 | | 0.10 | | 0.07 | |

$t$ statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

### 4.1. Life satisfaction and worries

As shown in Table 5, column 1, first-time full-time self-employment is not positively associated with life satisfaction at conventional levels of statistical significance ($b = 0.06, t = 1.80, p = .072$). In Table 6, column 1, I also list coefficients for alternative, less focused model specifications: the results are similar to my preferred specification reported above when focusing only on those self-employed who remain self-employed for three years or longer (which we can see as a sign of business success; $b = 0.07, t = 1.54, p = .124$). Only when we relax the stringent full-time restriction on self-employment and include all forms of repeated and part-time self-employment or when we use a simple dummy variable for self-employment that incorporates all the entries into but also out of self-employment do we see a statistically significant coefficient for life satisfaction (for instance, for the latter, the coefficient is $b = 0.09, t = 4.00, p < .001$). The effect of self-employment on life satisfaction is thus quite nuanced and strongly model-dependent. This heterogeneity of coefficients reflects, it seems, the different situations that a self-employment dummy can capture (part-time vs. full-time, in- vs. out-switch, multiple vs. first-time self-employment).

For comparison, estimating the main model with job satisfaction as the dependent variable shows strong positive and statistically significant effects (see Online Appendix, Table 1, column 1, $b = 0.64, t = 11.96, p < .001$). This is roughly one-third of the standard deviation of the job satisfaction variable and nearly the order of magnitude of the coefficient size of unemployment on life satisfaction (with similarly scaled variables, e.g., Kassenboehmer & Haisken-De New, 2009). The effect robustly holds at similar magnitudes when part-time self-employment is included as well as when a simple self-employment dummy that incorporates

**Table 6**
Fixed effects OLS regressions, with life satisfaction as the dependent variable. Each line gives the coefficient for a different construction of the self-employment dummy variable from a separate FE OLS regression model (specified otherwise as the main model) to explore the robustness of the results with respect to decisions about how to code self-employment, and whether to include, e.g., part-time self-employment, focus on those self-employed who remain in business for three years or more etc. Models compare to Tables 5 and 9. Control variables and region and year dummies are present but not reported. Robust standard errors clustered at the individual level.
*Source:* SOEP v37, waves 1–37 (1984–2020).

| | (1) Self-employment | | (2) Opportunity SE | | (3) Necessity SE | |
|---|---|---|---|---|---|---|
| Self-employed (full-time, in/out) | 0.09*** | (4.00) | 0.10** | (2.97) | 0.18** | (2.83) |
| Self-employed (all) | 0.07* | (2.51) | 0.04 | (1.16) | 0.62*** | (7.40) |
| Self-employed (full-time) | 0.06 | (1.80) | 0.02 | (0.55) | 0.69*** | (7.12) |
| Self-employed (full-time, 3yr+) | 0.07 | (1.54) | 0.02 | (0.37) | 0.76*** | (5.38) |
| Opportunity-SE (resign) | | | −0.20 | (−0.72) | | |
| Opportunity-SE (resign, 3yr) | | | −0.01 | (−0.16) | | |
| Necessity-SE (fired/closure) | | | | | 0.85*** | (5.11) |
| Necessity-SE (fired/closure, 3yr) | | | | | 0.85*** | (6.14) |

*t* statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

**Table 7**
Regressions adding worries and interaction terms. Fixed effects OLS regressions, with life satisfaction as the dependent variable. Model (1) shows the effect of different worries on life satisfaction while controlling for self-employment status. Model (2) interacts the worry category variable with the self-employment variable. Time and region dummies, as well as all control variables from the main analysis, are present but not reported. Robust standard errors clustered at the individual level.
*Source:* SOEP v37, waves 1–37 (1984–2020).

| | DV: Life satisfaction | | | |
|---|---|---|---|---|
| | (1) Worries + Self-employment | | (2) + Interactions | |
| **Independent variables:** | | | | |
| Worries about economic development | | | | |
| Some Worries | −0.02* | (−2.12) | −0.02* | (−2.16) |
| Big Worries | −0.02* | (−2.09) | −0.02* | (−2.13) |
| Worries about financial situation | | | | |
| Some Worries | −0.30*** | (−40.42) | −0.30*** | (−39.68) |
| Big Worries | −0.76*** | (−57.25) | −0.75*** | (−56.10) |
| Worries about job security | | | | |
| Some Worries | −0.14*** | (−18.33) | −0.14*** | (−18.18) |
| Big Worries | −0.32*** | (−24.72) | −0.31*** | (−24.16) |
| Self-employed (full-time) | 0.04 | (1.13) | 0.14* | (2.54) |
| Worries about economic development | | | | |
| Some WorriesX Self-employed | | | 0.02 | (0.36) |
| Big WorriesX Self-employed | | | 0.04 | (0.58) |
| Worries about financial situation | | | | |
| Some WorriesX Self-employed | | | −0.12** | (−2.71) |
| Big WorriesX Self-employed | | | −0.27*** | (−3.53) |
| Worries about job security | | | | |
| Some WorriesX Self-employed | | | 0.05 | (1.18) |
| Big WorriesX Self-employed | | | −0.24** | (−2.58) |
| Control variables as in previous models | Yes | | Yes | |
| Observations | 278,082 | | 278,082 | |
| F-statistic | 99.57 | | 92.42 | |
| Degrees of freedom | 48,139.00 | | 48,139.00 | |
| Adjusted R-squared | 0.06 | | 0.06 | |

*t* statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

repeated entries into and exits out of self-employment is constructed (here, the coefficients are slightly smaller, see Online Appendix, Table 1, column 1).

How self-employment impacts worries is depicted in columns 2–5 of Table 5. As we can see, becoming self-employed significantly increases worries about one's own finances ($b = 0.03, t = 2.04, p = .041$, column 2). The effect size is quite small (5% of one SD of the worry variable). To give a different sense of the effect size, I can estimate the same model via the BUC ordered choice panel estimator (an extension of a fixed effects logit model for ordinal outcomes; see Baetschmann, Ballantyne, Staub, & Winkelmann,

2020). Computing marginal effects at the sample average then yields a change in the probability of ending in the different worry categories as a result of becoming self-employed as follows: having no worries is 2.5% less likely, having moderate worries is nearly unchanged (a risk increase of 0.4%) and the risk of having big worries increases by 2.2%.

Additional regressions show that evidence for a similar change in worries cannot be found when focusing on job security worries or worries about the (macro) economic situation in general (Table 5, columns 3 and 4). This does not appreciably change when extending the analysis to part-time self-employed or when simple self-employment dummies are used, which allow for repeated self-employment and entering into self-employment as well as exiting out of it (results available in Online Appendix, Table 5).

I have also checked whether the worry variables might just pick up variation associated with individuals' personalities, specifically their degree of neuroticism. If personality traits were stable, fixed effects regressions would automatically remove them as potential confound. But this assumption might be slightly heroic (e.g., Boyce, Wood, & Powdthavee, 2013), especially over longer time horizons or in periods of drastic changes in personal situations (such as becoming unemployed). At the cost of severely reducing the sample size due to few years only in which personality traits were elicited in the SOEP, I can reestimate the worry model, while including variables from the short Big Five inventory (Table 5, column 5). While neuroticism indeed predicts worrying about one's financial situation ($b = 0.02, t = 17.68, p < .001$), its inclusion as a control variable cannot explain the somewhat larger coefficient for self-employment in this model ($b = 0.10, t = 2.73, p = .006$): this larger coefficient is a reflection of the different (reduced) estimation sample when personality trait variables are included. When we estimate the model on this reduced sample but without including personality trait variables, we see a nearly identical coefficient for worries (which also rounds to $b = .10$). In effect, this lack of difference in the coefficients with or without the neuroticism control variable suggests that omitting a specific neuroticism control in the main model does not bias the results appreciably (neuroticism seems stable enough to be well controlled via fixed effects).

Overall, the analysis thus far provides evidence in favor of Hypothesis 2a that becoming self-employed leads to increased financial worries. However, I do not find support for Hypothesis 2b, as self-employment is not consistently related to worries about job security (this will be qualified in the subsequent heterogeneity analysis).

### 4.2. The mediating role of worries

Putting together self-employment and worries in their effects on life satisfaction is the first step in testing the hypothesis that worries act as mediators in the relationship between self-employment and life satisfaction. In Table 7, column 1, I present a model in which worries are key independent variables and life satisfaction is the dependent variable (while also controlling for self-employment). All three types of worries decrease life satisfaction compared with their baseline of not worrying, but this comes with markedly different effect sizes: worries about the economy only impact life satisfaction with a rather minuscule coefficient ($b = -0.02$), whereas financial and job security worries have a much stronger negative impact: for "some worries" about job security, life satisfaction decreases by $b = -.14, t = -18.33, p < .001$ compared with baseline, for big worries by $b = -.32, t = -24.72, p < .001$, and the coefficients for worries about one's financial situation are $b = -.30, t = -40.42, p < .001$ for moderate worries and a quite large $b = -.76, t = -57.25, p < .001$ for big worries. Few studies in the literature have assessed the relationship between worries and life satisfaction, and comparisons of effect sizes are hampered by different methodologies and data scaling. For example, an early study finds micro-worries negatively correlated with life satisfaction, where semipartial correlations are on the order of −.24 to −.36 (Boehnke et al., 1998, p. 777). More closely related, Roth et al. (2017) find (with the same SOEP dataset) a much greater negative effect of financial worries on life satisfaction ($b = -1.348$, p. 138), but the models are quite different and difficult to compare. In my own work, in a different context, but with the SOEP data, financial situation worries were also correlated with life satisfaction at $r = -.35$, and the coefficient of the worry variable in a continuous specification in a fixed effects life satisfaction regression was −.40 (Binder & Blankenberg, 2016, pp. 5–7). Overall, the effect sizes found in the present paper do not seem untypically large.

Individually regressing life satisfaction and worries on self-employment or presenting a model in which life satisfaction is regressed on worries while controlling for self-employment is not yet strict evidence for the hypothesized mediation hypothesis. A stringent test for the mediation hypothesis needs to jointly estimate both regression equations (i.e. Eqs. (3) and (4), as discussed in Section 3.1). Using Seemingly Unrelated Regressions and the Preacher-Hayes-method discussed above, I estimate the direct and indirect effects that self-employment has on life satisfaction. Table 8 shows the direct and indirect effects resulting from a number of mediation models (all the models use the control variables discussed above, which are not depicted to conserve space). The upper and middle panels of Table 8 show mediation models using financial worries (upper part) and job security worries (middle part) as single mediators. But mediation models should include all potentially relevant mediators simultaneously to mitigate omitted variable bias. For this reason, I have also estimated as my preferred specification a multiple mediator model including all three types of worries, as well as household income and hours worked as (objective) channels through which self-employment will likely impact life satisfaction. Owing to the cross-sectional nature of the mediation models, as well as other potentially unmeasured confounders, these estimates are difficult to tag as causal and should be understood as possible indications for such a relationship. The main point of this analysis is not to exhaustively list all the mediators but to show that, in addition to an indirect effect from becoming self-employed via one's income, worries about this financial situation have additional explanatory power and impact on life satisfaction.

The mediation model is consistent with the hypothesized mediation relationship of "entrepreneurial worries" for life satisfaction and with the patterns that emerged in the previous section: strong evidence for a direct effect of self-employment on life satisfaction is absent (if at all, the single mediator model with job security worries shows a negative association). But I find that both worries are indirectly related to life satisfaction, both in the single mediator models (upper and middle part) and in the multiple mediator model (lower part). In the single mediator models, financial worries have a negative indirect effect (upper part, $b = -.06, z = -4.78, p <$

**Table 8**
Bootstrapped mediation analysis (life satisfaction). All the models show the direct effect on life satisfaction, as well as the indirect effects through financial worries (upper row), job security worries (middle row) and all three worries plus changes in working hours and (net equivalized) household income (lower row, multiple mediator model). All the control variables from the main analysis (plus a gender control variable) are present but not reported. Note that the mediation approach does not use FE methodology but focuses on the first episode of becoming self-employed.
*Source:* SOEP v37, waves 1–37 (1984–2020).

| **Mediation analysis; dependent variable: Life satisfaction (5000 repetitions)** | | |
|---|---|---|
| | Model 1: SE vs. remain FT E | |
| Variable | Coefficient (and Bootstrap SE) | Confidence Interval (Bias-corrected) |
| Single Mediator: Financial Worries | | |
| Self-employment (direct) | −0.04 (0.06) | (−0.15, 0.07) |
| Financial Worries (indirect) | −0.06 (0.01) *** | (−0.09, −0.04) |
| Single Mediator: Job Security Worries | | |
| Self-employment (direct) | −0.13 (0.06) * | (−0.24, −0.01) |
| Job Security Worries (indirect) | 0.04 (0.01) *** | (0.03, 0.06) |
| Multiple Mediators: All three worries | | |
| Self-employment (direct) | 0.02 (0.06) | (−0.11, 0.15) |
| Economic Development Worries (indirect) | 0.00 (0.00) | (0.00, 0.00) |
| Financial Worries (indirect) | −0.05 (0.01) *** | (−0.08, −0.03) |
| Job Security Worries (indirect) | 0.01 (0.00) * | (0.00, 0.01) |
| Income (indirect) | 0.01 (0.00) | (0.00, 0.02) |
| Hours worked (indirect) | −0.04 (0.01) *** | (−0.06, −0.02) |

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

.001), whereas for job security worries the indirect effect is positive (middle part, $b = .04, z = 5.24, p < .001$). In the multiple mediator model, only the coefficient for financial worries is negative in a similar magnitude ($b = -.05, z = -4.03, p < .001$). This confirms that part of the life satisfaction effect is due to an increase in financial worries and a loss of life satisfaction resulting from this increase in worries. For job security worries, the indirect effect is now smaller ($b = .01, z = 2.26, p = .024$). Overall, even if job security worries were to decrease through self-employment, an indirect positive association with life satisfaction is much less pronounced in the multiple mediation model. Finally, the direct effect of self-employment on life satisfaction in the multiple mediators model is zero.

Compare these associations also with the additional mediators hours worked and income (log equivalized household income). Hours worked are significantly related to life satisfaction ($b = -.04, z = -3.69, p < .001$). In contrast, income is not significantly related to life satisfaction in this specification (indirect effect of $b = .01, z = 1.52, p = .129$), only in the models with more leniently constructed control groups (see Online Appendix, Table 7). A corresponding (objective) change in income is not only smaller in effect than that through hours worked but also has a weaker positive association with life satisfaction than the (subjective) change in worries has (−0.05 vs. 0.01). In this sense, for the self-employed in the SOEP panel dataset, their subjective perception of self-employment regarding income is more strongly relevant for their well-being than the corresponding objective outcome (measured as the change in income resulting from becoming self-employed). This is in line with findings reported in Stephan (2018, p. 303) that subjective factors such as perceived business success are more strongly related to an entrepreneur's well-being than objective factors such as actual financial business success. To be clear, individuals' subjective worries about the financial situation are likely based in part on expectations of future lower earnings (and hence, of course, worries will be to some extent rooted in the objective condition of the individual), but the point is that through worries, the subjective experience of the individual regarding their objective situation is associated with well-being in addition to their changes in objective situation (as measured by the actual change in household income). Both have independent indirect effects. Future research could determine the extent to which worries track the income expectations of the self-employed and the extent to which these expectations might be overoptimistic or not (compare Odermatt et al., 2021).

To assess the robustness of this analysis and make the results more directly comparable to those of the fixed effects analysis above, I can estimate a SUR mediation model on the main analysis sample and perform the within transformation by hand. These results confirm the analysis presented thus far, but effect sizes are attenuated (the indirect effect of financial worries decreases to $b = -.02, z = -3.63, p < .001$; the detailed results are provided in Online Appendix, Table 6). Finally, note that this mediation pattern can be found to have a similar magnitude for a narrower job satisfaction variable (see Online Appendix, Table 3), but here, the negative indirect effect through financial worries is more than offset by the positive direct effect that self-employment has on job satisfaction.

All in all, I find support for the mediation Hypothesis 3, i.e., that entrepreneurial worries are mediators in the relationship between self-employment and life satisfaction, and greater worries decrease life satisfaction. As self-employment tends to decrease job security worries and tends to increase financial situation worries, there are two countervailing indirect influences: a positive indirect effect through job security worries and a negative indirect effect through financial situation worries. These countervailing

influences (alongside other mediators) can then explain why the overall effect of becoming self-employed on life satisfaction is small and not statistically distinguishable from zero.

The mediation analyses show that self-employment can bring about worries that hinder an increase in life satisfaction. An additional interesting question is then, what actually the effect is of self-employment given different level of worries. Does self-employment increase life satisfaction in the absence of worries and to what extent does it decrease life satisfaction in the presence of worries? To test this, I performed an additional analysis, where I interact the self-employment variable with the categorical worries variables (see Table 7, column 2). Wald tests confirm for all interaction models that these interaction terms are jointly significantly different from zero and have explanatory power (all at $p < .001$). While the above mediation model gives the coefficient for the indirect effect of becoming self-employed on life satisfaction through worries, the interaction model shows the total effect of becoming self-employed on life satisfaction, given the three different levels of worry, individuals can experience becoming self-employed (in this sense, the interaction analysis should not be understood as a moderation analysis, because in a typical moderation analysis, the moderator comes temporally before the independent variable).

The pattern to emerge here is that self-employment is positively related to life satisfaction in the absence of entrepreneurial worries ($b = .14, t = 2.54, p = .011$). Increasing worries about one's finances and job security leads to the overall effect turning negative, i.e., a well-being-enhancing self-employment experience turns into a loss of well-being from self-employment when worries about one's financial situation or job security increase to "big worries". This interaction effect is graphically depicted in Fig. 1 for worries about one's financial situation (left diagram) and worries about job security (right diagram). Even moderate worries about the financial situation nearly cancel out the main positive effect of self-employment on life satisfaction. In contrast to these micro-worries, there are no statistically significant interaction effects in regard to the macro-worry about economic conditions.[1]

## 5. Heterogeneity analysis

So far, I have explored the well-being consequences of self-employment in general and the role that worries play in mediating potential well-being gains or losses. In this section, I explore Hypotheses 1 through 3 with respect to "opportunity self-employment" versus "necessity self-employment", as it is likely that someone being pushed into (necessity) self-employment to avoid unemployment will see things through a different lens than someone voluntarily leaving a paid job to pursue entrepreneurial opportunities (Block & Koellinger, 2009; Reynolds et al., 2005).

Compared with more specialized surveys, the SOEP does not allow the direct assessment of motivation for self-employment via a specific item in the questionnaire, so that I have to impute motive by looking at the transition into self-employment. Following previous work (e.g., Binder & Coad, 2016; Block & Koellinger, 2009; Odermatt et al., 2021), I characterize a transition from employment to self-employment as a case of opportunity self-employment (observed for 1327 individuals), whereas a transition from registered unemployment to self-employment constitutes a case of necessity self-employment (338 individuals).[2]

This analysis is summarized in Table 9, which shows marked differences with respect to the two types of self-employment and their effects on worries and life satisfaction. Becoming opportunity self-employed increases worries about the financial situation by $b = .06, t = 3.34, p < .001$ (see column 1), which is more than in the main analysis above. The reason why the average financial worry coefficient in the overall self-employment group is smaller than that for opportunity self-employed can be understood when focusing on the necessity self-employed (column 5), for which the switch from unemployment to self-employment is associated with much lower financial worries ($b = -0.19, t = -5.19, p < .001$, which is nearly one-third of the SD of the worry variable in the sample). In addition, becoming necessity self-employed is also associated with a much decreased level of worrying about job security ($b = -.36, t = -3.32, p < .001$). With respect to life satisfaction, both types of self-employment differ: I find no evidence for an effect for opportunity self-employment ($b = 0.02, t = 0.55, p = .585$, column 3). What is striking, on the other hand, is the large positive coefficient for necessity self-employment ($b = 0.69, t = 7.12, p < .001$, column 7), which is also statistically highly significant.

The interaction models then show a similar picture for opportunity self-employment (column 2) as the main model (compare Table 7). A positive coefficient for opportunity self-employment absent any worries ($b = .13, t = 2.13, p = .033$) is decreased to close to zero when financial worries are moderate (interaction term $b = -.12, t = -2.54, p = .011$) and negative when individuals worry a lot about their finances ($b = -.22, t = -2.39, p = .017$). This does not seem to happen, however, in the case of necessity self-employment, where the strong positive main effect is only neutralized when the individual worries a lot about job security ($b = -.78, t = -3.44, p < .001$). This could be due to some scarring effect on the formerly unemployed (especially when job loss is involuntary; compare Clark, Georgellis, & Sanfey, 2001; Hoang & Knabe, 2021; Knabe & Raetzel, 2011).

While my coding of opportunity and necessity self-employment thus far is quite coarse, the SOEP dataset also provides information on why individuals have changed their jobs, allowing us to operationalize opportunity and necessity self-employment by looking into the reason for giving up one's previous job. Following Block and Sandner (2009) and Block and Wagner (2010), I can also define opportunity self-employment as resigning from paid employment to become self-employed in the year of the switch or the previous two years and necessity self-employment as self-employment following being dismissed or the closure of the previous employers' business. When the models are estimated in this way, the opportunity self-employment dummy remains statistically indistinguishable from zero (see Table 10, columns 1 and 3), whereas the coefficient size for necessity self-employment even increases slightly ($b = .85, t = 5.11, p < .001$, columns 2 and 4).

[1] A similar interaction pattern also exists for job satisfaction, however, job security does not seem to figure as relevant here, as the interaction is limited to worries about one's own financial situation, see Online Appendix, Table 2, column 3. In addition, the negative interaction term is smaller than the main term, resulting in an overall positive effect for job satisfaction despite worrying about one's finances.

[2] See Online Appendix, Section 6, for more detail on the creation of the variables.

**Table 9**
Heterogeneity analysis repeating main regressions now separately for opportunity self-employment (columns 1–4) and necessity self-employment (columns 5–8). Fixed effects OLS regressions, with life satisfaction as the dependent variable. Models (1) and (2) show the effect on worries and models (3) and (4) on life satisfaction when becoming opportunity self-employed. Analogous specifications follow for necessity self-employment (columns 5–8). Time and region dummies, as well as all control variables from the main analysis, are present but not reported. Robust standard errors clustered at the individual level.
*Source:* SOEP v37, waves 1–37 (1984–2020).

| | Opportunity SE DV: Worries | | Opportunity SE DV: Life satisfaction | | Necessity SE DV: Worries | | Necessity SE DV: Life satisfaction | |
|---|---|---|---|---|---|---|---|---|
| | (1) Worries: Own Finances | (2) Worries: Job Security | (3) Life satisfaction | (4) Interactions | (5) Worries: Own Finances | (6) Worries: Job Security | (7) Life satisfaction | (8) Interactions |
| **Independent variables:** | | | | | | | | |
| Worries about economic development | | | | | | | | |
| Some Worries | | | | −0.02 | | | | 0.02 |
| | | | | (−1.93) | | | | (0.71) |
| Big Worries | | | | −0.02 | | | | −0.01 |
| | | | | (−1.92) | | | | (−0.52) |
| Worries about financial situation | | | | | | | | |
| Some Worries | | | | −0.30*** | | | | −0.37*** |
| | | | | (−39.53) | | | | (−19.09) |
| Big Worries | | | | −0.75*** | | | | −0.89*** |
| | | | | (−55.70) | | | | (−31.43) |
| Worries about job security | | | | | | | | |
| Some Worries | | | | −0.14*** | | | | −0.15*** |
| | | | | (−17.97) | | | | (−9.00) |
| Big Worries | | | | −0.31*** | | | | −0.34*** |
| | | | | (−23.82) | | | | (−13.97) |
| Self-employed (full-time) | 0.06*** | −0.02 | 0.02 | 0.13* | −0.19*** | −0.36*** | 0.69*** | 0.68* |
| | (3.34) | (−1.04) | (0.55) | (2.13) | (−5.19) | (−3.32) | (7.12) | (2.32) |
| Worries about economic development | | | | | | | | |
| Some WorriesX Self-employed | | | | 0.04 | | | | −0.18 |
| | | | | (0.67) | | | | (−1.23) |
| Big WorriesX Self-employed | | | | 0.01 | | | | −0.08 |
| | | | | (0.19) | | | | (−0.48) |
| Worries about financial situation | | | | | | | | |
| Some WorriesX Self-employed | | | | −0.12* | | | | −0.12 |
| | | | | (−2.54) | | | | (−0.79) |
| Big WorriesX Self-employed | | | | −0.22* | | | | −0.04 |
| | | | | (−2.39) | | | | (−0.18) |
| Worries about job security | | | | | | | | |
| Some WorriesX Self-employed | | | | 0.05 | | | | −0.12 |
| | | | | (1.06) | | | | (−1.01) |
| Big WorriesX Self-employed | | | | −0.16 | | | | −0.78*** |
| | | | | (−1.43) | | | | (−3.44) |
| Control variables as in previous models | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 355,798 | 278,332 | 354,913 | 272,234 | 109,200 | 59,067 | 109,125 | 58,169 |
| F-statistic | 94.43 | 79.54 | 43.08 | 89.88 | 31.51 | 23.64 | 15.49 | 27.36 |
| Degrees of freedom | 51,449.00 | 48,059.00 | 51,213.00 | 46,390.00 | 12,962.00 | 8873.00 | 12,933.00 | 8630.00 |
| Adjusted R-squared | 0.03 | 0.04 | 0.02 | 0.05 | 0.03 | 0.04 | 0.02 | 0.07 |

*t* statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Conducting a mediation analysis for both types of self-employment (see Table 11) also reveals a heterogeneity in life satisfaction responses. For the opportunity self-employed, no direct effects on life satisfaction are detectable, but positive indirect routes are detected via job security worries (coefficients are roughly in line with the main model). In addition, opportunity self-employment is indirectly related to life satisfaction through objective channels (income and hours worked). For the necessity self-employed, the mediation models show strong positive direct and indirect effects of self-employment on life satisfaction, and the coefficients are comparable in size with the fixed effects (but not mediated) models presented above. Note specifically that financial worries also mediate the relationship for the necessity self-employed, but here the indirect effect is positive and much larger than otherwise ($b = .19, z = 2.18, p = .030$, lower right part in Table 11). I have also repeated the complete heterogeneity analysis with job satisfaction as the dependent variable, and patterns mirror the main analysis (strong and uniformly positive direct influence of all types of self-employment on job satisfaction, small negative indirect effect of financial worries for the opportunity self-employed; the results are provided in Table 4 in the Online Appendix).

Overall, this analysis provides no evidence for Hypothesis 1; on the contrary: not opportunity self-employed enjoy robust increases in life satisfaction but the necessity self-employed do. This strong coefficient for necessity self-employment seems to fly in the face of previous research and theorizing, as previous research often found positive coefficients for opportunity self-employed but not for the necessity self-employed (e.g., see Binder & Coad, 2013, 2016). However, these differences become understandable when the nature of estimator employed in this work is considered, which provides estimates of the average treatment effect on the treated (ATT), not an average treatment effect (ATE). The control group here is the same individual before becoming self-employed, whereas cross-sectional studies in the literature compare individuals in self-employment with other individuals not in self-employment. In the presence of selection unobservables, ATE and ATT may well differ. To show this from a different perspective, I have also computed the two-way fixed effects estimate of becoming employed full-time after being unemployed: the coefficient here is $b = 1.10, t = 8.42, p < .001$ and is even greater than the one presented above for the switch from unemployment to full-time

**Table 10**
Fixed effects OLS regressions, with life satisfaction as the dependent variable. Dummy construction for opportunity and necessity self-employment now incorporates information about the reason for job change. Opportunity self-employment is defined as self-employment following voluntary termination of employment. Necessity self-employment is defined as self-employment following dismissal or plant closure. The left panel uses job change information immediately preceding self-employment, whereas the right hand panel more leniently uses the three year period before self-employment to increase the number of applicable cases. All control variables and region and year dummies are present but not reported. Robust standard errors clustered at the individual level.
*Source:* SOEP v37, waves 1–37 (1984–2020).

| | Job change information year before switch Dependent variable: Life satisfaction | | Job change information three year period Dependent variable: Life satisfaction | |
|---|---|---|---|---|
| | (1) Opportunity SE | (2) Necessity SE | (3) Opportunity SE | (4) Necessity SE |
| **Independent variables:** | | | | |
| Opportunity-SE (resign) | −0.20 (−0.72) | | | |
| Necessity-SE (fired/closure) | | 0.85*** (5.11) | | |
| Opportunity-SE (resign, 3yr) | | | −0.01 (−0.16) | |
| Necessity-SE (fired/closure, 3yr) | | | | 0.85*** (6.14) |
| Control variables as in previous models | Yes | Yes | Yes | Yes |
| Observations | 344,018 | 107,981 | 347,841 | 108,188 |
| F-statistic | 42.17 | 15.14 | 42.50 | 15.30 |
| Degrees of freedom | 49,997.00 | 12,709.00 | 50,379.00 | 12,746.00 |
| Adjusted R-squared | 0.02 | 0.02 | 0.02 | 0.02 |

*t* statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

**Table 11**
Bootstrapped mediation analysis (life satisfaction, opportunity- and necessity self-employment). All models show the direct effect on life satisfaction, as well as the indirect effects through financial worries (upper row), job security worries (middle row) and all three worries plus changes in working hours and (net equivalized) household income (lower row, multiple mediator model). All the control variables from the main analysis (plus a gender control variable) are present but not reported. Note that the mediation approach does not use FE methodology but focuses on first episode of becoming self-employed.
*Source:* SOEP v37, waves 1–37 (1984–2020).

| **Mediation analysis; dependent variable: Life satisfaction (5000 repetitions)** | | | | |
|---|---|---|---|---|
| | Model Opp.SE: SE vs. remain FT E | | Model Nec.SE: SE vs. remain U | |
| Variable | Coefficient (and Bootstrap SE) | Confidence Interval (Bias-corrected) | Coefficient (and Bootstrap SE) | Confidence Interval (Bias-corrected) |
| Single Mediator: Financial Worries | | | | |
| Self-employment (direct) | 0.06 (0.06) | (−0.07, 0.18) | 0.79 (0.10) *** | (0.58, 0.99) |
| Financial Worries (indirect) | −0.02 (0.02) | (−0.05, 0.01) | 0.26 (0.05) *** | (0.17, 0.35) |
| Single Mediator: Job Security Worries | | | | |
| Self-employment (direct) | 0.00 (0.07) | (−0.14, 0.14) | 0.79 (0.22) *** | (0.36, 1.22) |
| Job Security Worries (indirect) | 0.06 (0.01) *** | (0.04, 0.08) | 0.23 (0.09) ** | (0.09, 0.45) |
| Multiple Mediators: All three worries | | | | |
| Self-employment (direct) | 0.08 (0.07) | (−0.06, 0.22) | 0.71 (0.21) ** | (0.25, 1.10) |
| Economic Development Worries (indirect) | 0.00 (0.00) | (0.00, 0.00) | −0.01 (0.02) | (−0.10, 0.01) |
| Financial Worries (indirect) | −0.01 (0.01) | (−0.04, 0.01) | 0.19 (0.09) * | (0.05, 0.38) |
| Job Security Worries (indirect) | 0.01 (0.00) ** | (0.01, 0.02) | 0.10 (0.06) | (0.01, 0.26) |
| Income (indirect) | 0.02 (0.01) *** | (0.01, 0.03) | 0.06 (0.06) | (−0.04, 0.21) |
| Hours worked (indirect) | −0.04 (0.01) ** | (−0.06, −0.02) | not in model | not in model |

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

self-employment.[3] Substantively, being no longer unemployed is a boon for life satisfaction, but the life satisfaction gains are greater when individuals find gainful employment instead of self-employment.

[3] This shows that, for instance, the results in this work and in Binder and Coad (2016) are compatible insofar as switching from unemployment to self-employment increases life satisfaction, but does so less than switching from unemployment to employment. A positive coefficient for the within estimator is compatible with a zero or negative coefficient from a between comparison, as the control groups in both cases differ markedly (compare Binder & Coad, 2016, pp. 1420–1).

In conclusion, the heterogeneity analysis provides evidence that lumping together all types of self-employment (as in the main analysis) hides the heterogeneity of the reactions inherent in the different types of self-employment and that both the direct and indirect effects of becoming self-employed on life satisfaction differ depending on the motivation for becoming self-employed. These different (objective) circumstances are accompanied by differing subjective perceptions as measured by individuals' worries about the circumstances and both prove to be relevant for one's life satisfaction.

## 6. Conclusion

Across the board in the literature, self-employment is beneficial for job satisfaction but does not necessarily lead to higher life satisfaction. The large heterogeneity of different types of self-employment with respect to (objective) job characteristics is likely the explanation for differences in life satisfaction (Binder, 2018; Williams et al., 2017). But there is additional heterogeneity with respect to how the self-employed perceive their situation, a subjective lens through which they experience the objective job characteristics of their work (Stephan, 2018). The focus of the present paper has been on examining this subjective heterogeneity and exploring the role that subjectively perceived worries about financial situation and job security play in contributing to the well-being that the self-employed can derive from their work.

I find, more concretely, no evidence that becoming self-employed in Germany results in greater life satisfaction in the average case, even though it increases job satisfaction. Only the necessity self-employed report higher life satisfaction when moving from unemployment to self-employment (but their life satisfaction would be even higher had they become employed instead). Using mediation analysis, I have shown that worries about one's financial situation (and to some extent also worries about job security) mediate the relationship between self-employment and life satisfaction. Life satisfaction decreases as the self-employed worry more about their financial security when they become self-employed. Only if one does not worry about one's financial situation at all does self-employment contribute positively to life satisfaction. My research here has provided one channel, viz. entrepreneurial worries, that can explain the heterogeneous findings in the literature regarding the relationship between self-employment and life satisfaction.

My findings that worries mediate the life satisfaction of the self-employed corroborate findings that expectations of job loss determine whether self-employment is positively or negatively related to life satisfaction (Hetschko, 2016): with increasing (subjectively assessed) probability of job loss, the self-employed are less satisfied with their lives than employed individuals are. This analysis also complements the findings of Millán et al. (2013) and Georgellis and Yusuf (2016) that being self-employed may result in dissatisfaction with job security. I find that worries about job security translate into lower life satisfaction and darken the experience of being self-employed. But since some of the German self-employed worry less about job security, the effect on life satisfaction is positive by comparison. Compared with the studies mentioned, some of the German self-employed seem to worry less about job security, but when they worry about it, it also negatively impacts their satisfaction.

This study has some obvious limitations. First, no observational research can easily claim causal relationships because of omitted confounds and endogeneity bias. Maybe individuals who are unhappy with their job or life may self-select into self-employment so that causality runs in the opposite direction (compare, for instance, Rose & Stavrova, 2019, who find that life satisfaction is related to the subsequent reemployment of unemployed individuals). Second, this study only begins to tap into the true heterogeneity of self-employment, and other classifications should be analyzed with respect to their well-being consequences. Third, other omitted variables such as personality traits beyond the Big Five or an entrepreneurial identity might drive self-selection into self-employment and make the findings applicable only to the self-selected sample at hand. Fixed effects regressions can take into account time-invariant person-specific heterogeneity but this might not be enough if such factors are actually variable and hence unaccounted for. Fourth, the yearly structure of the data might obscure more short-term changes in employment status and the effect this has on life satisfaction. If individuals change between jobs, for example, for seasonal work, the dataset does not lend itself to easily account for such job changes and their well-being impact.

Overall, this study emphasizes the need to account not only for objective facets of the self-employment experience in regard to explaining the well-being of the self-employed but also the subjective lens through which the self-employed see the world. For policy-makers, this means that it may not be enough just to improve objective conditions for self-employment but also to help the self-employed with measures targeting their subjective experience of these conditions. For example, where worrying is excessive and not borne out by the objective situation, stress-management techniques or confidence-building might be fruitful measures to consider (Binder, 2018). If, on the other hand, worrying is a result of overly optimistic income expectations before becoming self-employed (compare Odermatt et al., 2021), then preparing the future self-employed for the realities of self-employment would make more sense. Future research should explore to what extent entrepreneurial worries are distorted perceptions of reality and to what extent they are faithful indicators of an objectively worrying situation.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.joep.2024.102773.

## References


Alesina, A., Di Tella, R., & MacCulloch, R. (2004). Inequality and happiness: Are Europeans and Americans different? *Journal of Public Economics*, *88*, 2009–2042.

Allison, P. D. (2009). *Fixed effects regression models*. Los Angeles, others: Sage Publications.

Andersson, P. (2008). Happiness and health: Well-being among the self-employed. *Journal of Socio-Economics*, *37*(1), 213–236.

Baetschmann, G., Ballantyne, A., Staub, K. E., & Winkelmann, R. (2020). Feologit: A new command for fitting fixed-effects ordered logit models. *The Stata Journal*, *20*(2), 253–275.

Baron, R. A., Franklin, R. J., & Hmieleski, K. M. (2016). Why entrepreneurs often experience low, not high, levels of stress. *Journal of Management*, *42*(3), 742–768.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173.

Benz, M., & Frey, B. S. (2008a). Being independent is a great thing: Subjective evaluations of self-employment and hierarchy. *Economica*, *75*, 362–383.

Benz, M., & Frey, B. S. (2008b). The value of doing what you like: Evidence from the self-employed in 23 countries. *Journal of Economic Behavior and Organization*, *68*(3–4), 445–455.

Berge, L. I. O., Bjorvatn, K., & Tungodden, B. (2015). Human and financial capital for microenterprise development: Evidence from a field and lab experiment. *Management Science*, *61*(4), 707–722.

Berglund, V., Johansson, I. S., & Strandh, M. (2015). Subjective well-being and job satisfaction among self-employed and regular employees: Does personality matter differently? *Journal of Small Business and Entrepreneurship*, *28*(1), 55–73.

Bhuiyan, M. F., & Ivlevs, A. (2019). Micro-entrepreneurship and subjective well-being: Evidence from rural Bangladesh. *Journal of Business Venturing*, *34*(4), 625–645.

Binder, M. (2018). The way to wellbeing. CRSE policy report. Accessible at: http://www.crse.co.uk/research/way-wellbeing-0. (Last Accessed: 26 July 2018).

Binder, M., & Blankenberg, A.-K. (2016). Environmental concerns, volunteering and subjective well-being: Antecedents and outcomes of environmental activism in Germany. *Ecological Economics*, *124*, 1–16.

Binder, M., & Blankenberg, A.-K. (2021). Self-employment and subjective well-being. In K. F. Zimmermann (Ed.), *Handbook of labor, human resources and population economics*. Cham: Springer.

Binder, M., & Coad, A. (2013). Life satisfaction and self-employment: A matching approach. *Small Business Economics*, *40*(4), 1009–1033.

Binder, M., & Coad, A. (2016). How satisfied are the self-employed? A life domain view. *Journal of Happiness Studies*, *17*(4), 1409–1433.

Blanchflower, D. G. (2004). Self-employment: More may not be better. *Swedish Economic Policy Review*, *11*, 15–73.

Blanchflower, D. G., & Oswald, A. J. (1998). What makes an entrepreneur? *Journal of Labor Economics*, *16*(1), 26–60.

Block, J., & Koellinger, P. (2009). I can't get no satisfaction — necessity entrepreneurship and procedural utility. *Kyklos*, *62*(2), 191–209.

Block, J., Kritikos, A. S., Priem, M., & Stiel, C. (2022). Emergency-aid for self-employed in the Covid-19 pandemic: A flash in the pan? *Journal of Economic Psychology*, *93*, Article 102567.

Block, J., & Sandner, P. (2009). Necessity and opportunity entrepreneurs and their duration in self-employment: Evidence from german micro data. *Journal of Industry, Competition and Trade*, *9*(2), 117–137.

Block, J., & Wagner, M. (2010). Necessity and opportunity entrepreneurs in Germany: Characteristics and earnings differentials. *Schmalenbach Business Review*, *62*, 154–174.

Boehnke, K., Schwartz, S., Stromberg, C., & Sagiv, L. (1998). The structure and dynamics of worry: Theory, measurement, and cross-national replications. *Journal of Personality*, *66*(5), 745–782.

Boyce, C. J., Wood, A. M., & Powdthavee, N. (2013). Is personality fixed? Personality changes as much as variable economic factors and more strongly predicts changes to life satisfaction. *Social Indicators Research*, *111*(1), 287–305.

Bruederl, J. (2010). Kausalanalyse mit paneldaten. In C. Wolf, & H. Best (Eds.), *Handbuch der sozialwissenschaftlichen Datenanalyse* (pp. 963–994). Wiesbaden: VS Verlag.

Bullock, J. G., & Ha, S. E. (2011). Mediation analysis is harder than it looks. In J. N. Druckman, D. P. Green, J. H. Kuklinski, & A. Lupia (Eds.), *Cambridge handbook of experimental political science, chapter 35* (pp. 508–521). Cambridge/UK: Cambridge University Press.

Caliendo, M., & Kritikos, A. (2012). Searching for the entrepreneurial personality: New evidence and avenues for further research. *Journal of Economic Psychology*, *33*(2), 319–324, Personality and Entrepreneurship.

Ferrer-i Carbonell, A., & Frijters, P. (2004). How important is methodology for the estimates of the determinants of happiness? *The Economic Journal*, *114*, 641–659.

Cardon, M. S., & Patel, P. C. (2015). Is stress worth it? Stress-related health and wealth trade-offs for entrepreneurs. *Applied Psychology*, *64*(2), 379–420.

Chadi, A. (2013). The role of interviewer encounters in panel responses on life satisfaction. *Economics Letters*, *121*(3), 550–554.

Clark, A. E., Georgellis, Y., & Sanfey, P. (2001). Scarring: The psychological impact of past unemployment. *Economica*, *68*(270), 221–241.

Coad, A., & Binder, M. (2014). Causal linkages between work and life satisfaction and their determinants in a structural VAR approach. *Economics Letters*, *124*(2), 263–268.

Craig, J. B., Schaper, M., & Dibrell, C. (2007). *Life in small business in Australia: evidence from the HILDA survey*: *Mimeo*.

Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology*, *29*, 94–122.

Fuchs-Schündeln, N. (2009). On preferences for being self-employed. *Journal of Economic Behavior and Organization*, *71*(2), 162–171.

Gatignon, H. (2014). *Statistical analysis of management data* (3rd ed.). New York/Heidelberg: Springer.

Georgellis, Y., & Yusuf, A. (2016). Is becoming self-employed a panacea for job satisfaction? Longitudinal evidence from work to self-employment transitions. *Journal of Small Business Management*, *54*, 53–76.

Gerlitz, J.-Y., & Schupp, J. (2005). *Zur Erhebung der Big-Five-basierten Persoenlichkeitsmerkmale im SOEP*: *Research Notes 4*, DIW Berlin.

Gosling, S. D., Rentfrow, P. J., & Swann, W. B. J. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, *37*, 504–528.

Haisken-DeNew, J., & Frick, J. R. (2005). *DTC - desktop companion to the german socio-economic panel (SOEP). version 8.0-2005*. Berlin.

Hamilton, B. H. (2000). Does entrepreneurship pay? An empirical analysis of the returns of self-employment. *Journal of Political Economy*, *108*(3), 604–631.

Harbi, S. E., & Grolleau, G. (2012). Does self-employment contribute to national happiness? *The Journal of Socio-Economics*, *41*(5), 670–676.

Häusser, J. A., Mojzisch, A., Niesel, M., & Schulz-Hardt, S. (2010). Ten years on: A review of recent research on the job demand–control (-support) model and psychological well-being. *Work & Stress*, *24*(1), 1–35.

Hayes, A. F. (2009). Beyond baron and kenny: Statistical mediation analysis in the new millennium. In *Communication Monographs*: *vol. 76*, (no. 4), (pp. 408–420).

Hetschko, C. (2016). On the misery of losing self-employment. *Small Business Economics*, *47*(2), 461–478.
Hill, T. D., Davis, A. P., & Roos, J. M. (2020). Limitations of fixed-effects models for panel data. *Sociological Perspectives*, *63*(3), 357–369.
Hoang, T. T. A., & Knabe, A. (2021). Replication: Emotional well-being and unemployment – evidence from the American time-use survey. *Journal of Economic Psychology*, *83*, Article 102363.
Hobfoll, S. E. (2001). The influence of culture, community, and the nested-self in the stress process: Advancing conservation of resources theory. *Applied Psychology*, *50*(3), 337–421.
Hundley, G. (2001). Why and when are the self-employed more satisfied with their work? *Industrial Relations: A Journal of Economy and Society*, *40*(2), 293–316.
Hyytinen, A., & Ruuskanen, O. (2007). Time use of the self-employed. *Kyklos*, *60*(1), 105–122.
Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, *24*(2), 285–308.
Karlan, D., & Zinman, J. (2011). Microcredit in theory and practice: Using randomized credit scoring for impact evaluation. *Science*, *332*(6035), 1278–1284.
Kassenboehmer, S. C., & Haisken-De New, J. (2009). You're fired! The causal negative effect of entry unemployment on life satisfaction. *The Economic Journal*, *119*, 448–462.
Knabe, A., & Raetzel, S. (2011). Scarring or scaring? The psychological impact of past unemployment and future unemployment risk. *Economica*, *78*, 283–293.
Krueger, A. B., & Schkade, D. (2008). The reliability of subjective well-being measures. *Journal of Public Economics*, *92*, 1833–1845.
Lang, F. R., John, D., Lüdtke, O., Schupp, J., & Wagner, G. G. (2011). Short assessment of the big five: Robust across survey methods except telephone interviewing. *Behavior Research Methods*, *43*(2), 548–567.
Lange, T. (2012). Job satisfaction and self-employment: Autonomy or personality? *Small Business Economics*, *38*(2), 165–177.
Lerman, M. P., Munyon, T. P., & Williams, D. W. (2021). The (not so) dark side of entrepreneurship: A meta-analysis of the well-being and performance consequences of entrepreneurial stress. *Strategic Entrepreneurship Journal*, *15*(3), 377–402.
Lockey, A. (2018). Free radicals. Demos report. Available at: https://www.demos.co.uk/project/free-radicals/. (Last Accessed: 27 May 2018).
Luchman, J. N., & González-Morales, M. G. (2013). Demands, control, and support: A meta-analytic review of work characteristics interrelationships. *J. Occupational Health Psychol.*, *18*(1), 37–52.
Luhmann, M., Crayen, C., & Eid, M. (2010). Entwicklung der sorgen um die wirtschaftliche situation in ost- und westdeutschland. In I. Ostner, & P. Krause (Eds.), *Leben in Ost- und Westdeutschland. Eine sozialwissenschaftliche Bilanz der deutschen Einheit 1990-2010* (pp. 751–766). Campus, Frankfurt am Main.
Millán, J., Hessels, J., Thurik, R., & Aguado, R. (2013). Determinants of job satisfaction: A European comparison of self-employed and paid employees. *Small Business Economics*, *40*(3), 651–670.
Nightingale, P., & Coad, A. (2013). Muppets and gazelles: Political and methodological biases in entrepreneurship research. *Industrial and Corporate Change*, *23*(1), 113–143.
Obschonka, M., & Silbereisen, R. K. (2015). The effects of work-related demands associated with social and economic change on psychological well-being. *Journal of Personnel Psychology*, *14*(1), 8–16.
Odermatt, R., Powdthavee, N., & Stutzer, A. (2021). Are newly self-employed overly optimistic about their future well-being? *Journal of Behavioral and Experimental Economics*, *95*, Article 101779.
Olsen, J., Kasper, M., Kogler, C., Muehlbacher, S., & Kirchler, E. (2019). Mental accounting of income tax and value added tax among self-employed business owners. *Journal of Economic Psychology*, *70*, 125–139.
Patzelt, H., & Shepherd, D. A. (2011). Negative emotions of an entrepreneurial career: Self-employment and regulatory coping behaviors. *Journal of Business Venturing*, *26*(2), 226–238.
Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891.
Querstret, D., & Cropley, M. (2012). Exploring the relationship between work-related rumination, sleep quality and work-related fatigue. *Journal of Occupational Health Psychology*, *17*(3), 341–353.
Reynolds, P., Bosma, N., Autio, E., Hunt, S., De Bono, N., Servais, I., Lopez-Garcia, P., & Chin, N. (2005). Global entrepreneurship monitor: Data collection design and implementation 1998–2003. *Small Business Economics*, *24*(3), 205–231.
Rohrer, J. M., Brümmer, M., Schupp, J., & Wagner, G. G. (2021). Worries across time and age in the german socio-economic panel study. *Journal of Economic Behavior and Organization*, *181*, 332–343.
Rose, D., & Stavrova, O. (2019). Does life satisfaction predict reemployment? Evidence form german panel data. *Journal of Economic Psychology*, *72*, 1–11.
Roth, B., Hahn, E., & Spinath, F. M. (2017). Income inequality, life satisfaction, and economic worries. *Social Psychological and Personality Science*, *8*(2), 133–141.
Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. E. (2011). Mediation analysis in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass*, *5*(6), 359–371.
Schjoedt, L., & Shaver, K. G. (2007). Deciding on an entrepreneurial career: A test of the pull and push hypotheses using the panel study of entrepreneurial dynamics data. *Entrepreneurship Theory and Practice*, *31*(5), 733–752.
Schwartz, S. H., Sagiv, L., & Boehnke, K. (2000). Worries and values. *Journal of Personality*, *68*(2), 309–346.
Specht, J., Egloff, B., & Schmukle, S. (2011). Stability and change of personality across the life course: The impact of age and major life events on mean-level and rank-order stability of the big five. *Journal of Personality and Social Psychology*, *101*(4), 862–882.
Stephan, U. (2018). Entrepreneurs' mental health and well-being: A review and research agenda. *Academy of Management Perspectives*, *32*(3), 290–322.
Stephan, U., Rauch, A., & Hatak, I. (2023). Happy entrepreneurs? Everywhere? A meta-analysis of entrepreneurship and wellbeing. *Entrepreneurship Theory and Practice*, *47*(2), 553–593.
Thorgren, S., Wincent, J., & Sirén, C. (2013). The influence of passion and work–life thoughts on work satisfaction. *Human Resource Development Quarterly*, *24*(4), 469–492.
van der Zwan, P., Hessels, J., & Rietveld, C. A. (2018). Self-employment and satisfaction with life, work, and leisure. *Journal of Economic Psychology*, *64*, 73–88.
van Praag, B. M. S (1991). Ordinal and cardinal utility: An integration of the two dimensions of the welfare concept. *Journal of Econometrics*, *50*(1–2), 69–89.
Wach, D., Stephan, U., Weinberger, E., & Wegge, J. (2021). Entrepreneurs' stressors and well-being: A recovery perspective and diary study. *Journal of Business Venturing*, *36*(5), Article 106016.
Wagner, G. G., Frick, J. R., & Schupp, J. (2007). The German Socio-Economic Panel Study (SOEP) - Scope, Evolution and Enhancements. *Schmollers Jahrbuch*, *1*, 139–169.
Welter, F., Baker, T., Audretsch, D. B., & Gartner, W. B. (2017). Everyday entrepreneurship—a call for entrepreneurship research to embrace entrepreneurial diversity. *Entrepreneurship Theory and Practice*, *41*(3), 311–321.
Williams, M., Broughhton, A., Meager, N., Spiegelhalter, K., Johal, S., & Jenkins, K. (2017). The true diversity of self-employment - uncovering the different segments of the UK's self-employed workforce. Retrieved: http://www.crse.co.uk/research/true-diversity-self-employment. (Last Accessed: 08 April 2018).
Wooldridge, J. M. (2022). Stata discussion forum. https://www.statalist.org/forums/forum/general-stata-discussion/general/1595829-seemingly-unrelated-regression-with-panel-data-fixed-effects. (Last Accessed 11 March 2023).
Zellner, A. (1962). An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. *Journal of the American Statistical Association*, *57*(298), 348–368.
Zhao, X., Lynch, J. G., & Chen, Q. (2010). Reconsidering baron and kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, *37*(2), 197–206.