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Diverging Paths? The Impact of the COVID-19 Pandemic on Subjective Well-Being of the Solo Self-Employed and Employees in Germany (2019–2023)

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Abstract

Previous research indicates that the self-employed have higher subjective well-being (SWB) than employees. However, during the COVID-19 pandemic, many self-employed individuals experienced exceptionally high levels of economic stress due to limited government and social security support. This is especially true of the solo self-employed (i.e., self-employed without employees). Drawing on nationally representative panel data spanning the years 2019–2023—and thus the onset, peak, and fading out of the pandemic—we used fixed-effects regression models to analyze the SWB trajectories of the solo self-employed and employees in Germany in terms of life satisfaction and job satisfaction. Our results show that SWB was only moderately affected in 2020 but declined steeply in 2021. Although life satisfaction recovered moderately in 2022 and 2023, it remained substantially lower than pre-pandemic levels. The life satisfaction of the solo self-employed decreased more strongly than that of employees in 2020 and 2021. Job satisfaction also saw a steep decline in 2021, with solo self-employed individuals experiencing a greater drop than employees. However, the job satisfaction of the solo self-employed returned to pre-pandemic levels in 2022, whereas that of employees continued to decline in 2022 and 2023. These insights shed light on how the SWB of different employment groups was affected during this unprecedented crisis and provide valuable information for more effective interventions in future crises.

Keywords Subjective well-being · COVID-19 · Solo self-employed · Employees · Germany

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1 Introduction

The lives of people across the globe were abruptly and fundamentally changed by the outbreak of the COVID-19 pandemic. Measures to contain the spread of the virus had significant repercussions on both the public and private spheres. Social distancing mandates and lockdowns in particular contributed to a marked increase in anxiety, depression, stress, and feelings of social isolation and loneliness (Benke et al., 2022; Brodeur et al., 2021). Furthermore, work conditions were heavily impacted. Some sectors experienced a slowdown, others saw a surge in demand, resulting in heterogeneous effects on people's work hours—furloughs and short-time work for some, overtime for others (Alon et al., 2020; Bünning et al., 2020; Frodermann et al., 2020). These pandemic-related measures altered living and work conditions and had adverse effects on mental health and subjective well-being (SWB) (e.g., Bähr et al., 2022; Huebener et al., 2024; Kriechele et al., 2024; Nieuwenhuis & Yerkes, 2021; Patzina et al., 2024; Peters et al., 2023; Zoch et al., 2021), which intensified as the pandemic progressed—also with the advent of other crises (Benke et al., 2022; Entringer & Kröger, 2021; Kriechele et al., 2024; Patzina et al., 2024).

However, adversity and advantage in coping with the burdens resulting from the pandemic per se and with the restrictions to help contain it (e.g., lockdowns, social distancing) were unequally distributed across social groups (Adams-Prassl et al., 2020; Peters et al., 2023). It quickly became clear that in most countries the self-employed were particularly hard hit by the (negative) consequences of the pandemic and the restrictions associated with it (Adams-Prassl et al., 2020; Graeber et al., 2021; Torrès et al., 2022; Yue & Cowling, 2021). Research on the situation in Germany indicates that the self-employed were significantly more impacted than employees by pandemic-related sales and income losses (Kritikos et al., 2020; Peters & Schulze Buschoff, 2025). Income losses among the self-employed were not only more severe but also persisted longer; as of January 2022, twice as many self-employed individuals reported income losses due to the pandemic compared with employees (Peters & Schulze Buschoff, 2025). Furthermore, income losses were more pronounced among the self-employed than among employees (Graeber et al., 2021; Kritikos et al., 2020; Peters & Schulze Buschoff, 2025). The solo self-employed—that is, self-employed persons without employees—were particularly affected by the negative impact of the pandemic on income and by feelings of financial strain (Schulze Buschoff & Emmeler, 2021).

As it became evident that the self-employed were particularly vulnerable to financial difficulties and emergencies, the German government introduced various financial support programs. One of the earliest and most prominent was the Immediate Assistance Program (Soforthilfe-Programm), which provided a one-time payment of up to €15,000 to self-employed individuals affected by revenue declines. However, this financial aid could not fully compensate for income losses or cover living expenses, although this would have been necessary, especially for many solo self-employed individuals (Grabka, 2021). Thus, in contrast to the short-time working allowance available to employees, these measures did not offer sufficient protection against financial hardship (David et al., 2022; Grabka, 2021; Stiel et al., 2021; Weber et al., 2024).¹ Consequently, many self-employed individuals

¹The short-time working allowance (Kurzarbeitergeld) scheme was one of the most relevant measures in Germany in terms of protecting employees from income losses and furloughs. The Federal Employment Agency subsidizes up to 60% of employees' net income (or 67% for employees with children).

faced severe threats to their livelihoods, as contact restrictions, shutdowns, and restricted store opening hours limited their business, forcing many to give up their self-employment (Hanschke & Strauß, 2021; Kritikos et al., 2021). The pandemic thus underscored the vulnerability of the self-employed during crises, primarily due to their inadequate social security protection. The implications are profound: Research indicates that the mental health and life satisfaction of self-employed individuals deteriorated more than that of employees (Kritikos et al., 2020; Torrès et al., 2022; Yue & Cowling, 2021).

Although these studies explored how the pandemic affected the SWB of both the self-employed and employees, most covered only the initial phase. First research for Germany shows that being self-employed was associated with greater decreases in SWB compared with employees, indicating that the self-employed are a vulnerable group (Kritikos et al., 2020; Jaschke et al., 2023; Zoch et al. 2022). While these findings offer some insights, there is still a critical need to investigate how the medium-term consequences of the pandemic shaped the SWB trajectories of both self-employed individuals and employees. Key questions remain unanswered: Did SWB continue to deteriorate as the pandemic progressed, or did it recover with the rollout of vaccines and the easing of restrictions? Did the SWB trajectories of the solo self-employed and employees diverge as the pandemic unfolded and eventually receded?

This paper extends previous research by examining SWB trajectories not only during the initial phase of the pandemic but also as it progressed and receded, and by assessing whether SWB among employees and the solo self-employed recovered, or if lingering effects persisted—an aspect that previous research has not addressed. Using longitudinal data from the nationally representative German Panel Study Labour Market and Social Security (PASS; Trappmann et al., 2019) covering the years 2019–2023, we explored how different employment groups coped with extreme stressors over time, thus capturing the medium-term consequences of the pandemic. This period was characterized by multiple crises, including Russia's war against Ukraine, rising energy prices, and increasing inflation rates, all of which negatively impacted SWB (Kriechele et al., 2024). Although a few studies to date have explored how SWB (Huebener et al., 2024; Kriechele et al., 2024) and mental health (Patzina et al., 2024) developed during and after the pandemic in Germany, they did not focus on differences between the self-employed and employees.

Furthermore, previous studies have mostly not accounted for the fact that the self-employed are a very heterogeneous group, ranging from the solo self-employed to those with numerous employees (Binder, 2017; Johansson Sevä et al., 2015). Hence, this paper focuses on the solo self-employed, who tend to have more precarious working conditions compared with their counterparts with employees (Binder, 2017; Binder & Coad, 2012), and who appear to have been particularly affected economically by the restrictions to contain the virus (Schulze Buschoff & Emmeler, 2021). In doing so, we follow calls from researchers emphasizing the importance of recognizing the heterogeneity within the self-employed population to avoid blurring the relationship between self-employment and SWB (e.g., Binder, 2017). Finally, by examining different dimensions of SWB, this paper explores whether the pandemic had varying effects on SWB. It operationalizes SWB through measures of overall life satisfaction and job satisfaction. By distinguishing between these two aspects, it provides a more nuanced understanding of how different components of SWB were affected during the pandemic.

2 Self-Employment in Germany and the COVID-19 Pandemic

Self-employment in Germany is in a constant state of flux and is characterized by a high level of dynamism. This is true both of the number of self-employed individuals and the structure and composition of self-employment. Recent decades have seen a particular increase in the share of the solo self-employed. In 2002, the group of the self-employed included for the first time more solo self-employed persons than self-employed individuals with employees. This trend ended in 2012, and since then, the overall number of self-employed individuals has declined, with the number of solo self-employed individuals decreasing even more than that of self-employed individuals with employees. In 2023, around 8.5% of the German workforce were self-employed, which corresponds to around 3.9 million people (Federal Statistical Office, 2024).

In recent years, self-employment has emerged as a highly heterogeneous employment category encompassing various industries and professional fields. As this heterogeneity increases, the boundaries between dependent employment and self-employment are becoming increasingly blurred. Furthermore, in Germany, social security law has significant gaps in the protection of the self-employed, and labor law provides only fragmentary protection for self-employed individuals. For instance, statutory minimum wage regulations do not apply to the self-employed, leaving them without a lower limit of income protection. This problem is particularly prevalent in the platform economy, where orders or units of work are awarded online, largely independent of time and place, to workers who are formally classified as self-employed (Schulze Buschoff, 2018). Self-employment in Germany is increasingly diverse and polarized, with significant disparities in social circumstances and income levels compared with employees (Bonin et al., 2022). Overall, the development in recent years towards a diversification of self-employment has been accompanied by a comparatively high proportion of solo self-employed individuals with precarious working conditions characterized by irregular and low income and insufficient access to social security protections (Brenke & Beznoska, 2016; Conen et al., 2016; Vermeylen et al., 2017).

The lack of comprehensive social security coverage for the self-employed is predominantly a German phenomenon. Whereas most EU countries include self-employed individuals in state insurance schemes, Germany mandates compulsory insurance only for a few specific groups, or for those classified as bogus self-employed (Weber et al., 2024).² This limitation is based on the assumption that the self-employed can independently provide for their own welfare and do not require collective protection through public insurance systems (Schulze Buschoff, 2016). However, it is evident that many self-employed people—particularly the solo self-employed—are no different from those already subject to compulsory insurance or from employees, in that they rely on selling their labor and face the same social risks, such as old age, illness, and unemployment. Thus, there have been long-standing calls for the comprehensive inclusion of all self-employed workers in state social security systems (Fachinger, 2007; Schulze Buschoff, 2016).

² Some social insurance branches have been opened to self-employed individuals. Since 2006, self-employed persons have been eligible for voluntary continued participation in unemployment insurance, but only after a period of dependent employment. Health insurance became mandatory for all in 2009. However, social security rules remain fragmented, with about a quarter of self-employed persons enrolled in special mandatory pension schemes; this share varies widely by occupational group.

The pandemic highlighted the vulnerable situation of the self-employed in terms of social protection against labor market risks, as it quickly became clear that this group was particularly hard hit by its (negative) consequences (Kritikos et al., 2020, 2021; Seebauer et al., 2021; Schulze Buschoff & Emmeler, 2021). Hence, at the end of 2020, the government took steps to protect the self-employed by adopting the Social Protection Package I, which provided easier access to basic social security for the self-employed, among others. Financial support programs, such as the Immediate Assistance Program (Soforthilfe-Programm), provided one-time payments of up to €15,000 to those self-employed persons affected by revenue declines. However, the financial aid could not fully compensate for income losses or cover living expenses (Grabka, 2021). Unlike employees, the self-employed were not eligible for the short-time work allowance and remained poorly protected against risks such as unemployment and income loss. Many struggled to sustain their businesses during contact restrictions and quarantines, leading some to abandon self-employment altogether (Hanschke & Strauß, 2021; Kritikos et al., 2021). As a result, the self-employed faced greater financial worries and income losses than employees during the pandemic (Kritikos et al., 2020; Peters & Schulze Buschoff, 2025). In summary, the self-employed—especially solo self-employed individuals—were more affected than employees by the negative consequences of the pandemic, particularly in the form of financial losses (e.g., Schulze Buschoff & Emmeler, 2021). This raises the question of whether these financial losses and greater uncertainties also impacted their SWB.

3 Shifts in SWB Among Employees and the Self-Employed

The concept of SWB originated in positive psychology (Diener, 1984) and is associated with good health, longevity, better social relationships, work performance, and creativity (Diener et al., 2018).³ It has been increasingly adopted in fields such as sociology and economics as an indicator for quality of life (Diener & Chan, 2011; Stiglitz et al., 2009). SWB can be influenced by different areas of life, such as family situation, social environment, health, and work. In the absence of major life events and external shocks, SWB—and particularly its cognitive component, life satisfaction—is generally regarded as a relatively stable construct, exhibiting minimal fluctuations over time. Low levels of SWB may not only adversely impact individual health but can also lead to negative labor market outcomes, underscoring the importance of monitoring SWB as a vital element of social policy evaluation and development (McMahan & Estes, 2011). Hence, decreases in SWB may indicate that political actors should take social policy measures.

The pandemic—and government measures to contain it—resulted in restrictions on people's personal and professional lives. Along with financial losses and worries, there was an increase in subjective stresses such as loneliness, worry, and depression (Brodeur et al. 2021; Kritikos et al., 2020; Peters & Schulze Buschoff, 2025). Initial evidence for Germany indicates that SWB decreased during the first year after the outbreak of the pandemic

³Diener's definition of SWB comprises an affective and a cognitive component. The affective component refers to moods and emotions, which represent people's immediate evaluations of life events (Diener et al., 1999). When examining the course of SWB during the pandemic, we considered the cognitive component, life satisfaction, because a comprehensive assessment of the life situation was more meaningful for the present research than an assessment of the affective component.

(Bähr et al., 2022; Nieuwenhuis & Yerkes, 2021; Zoch et al., 2021). Therefore, based on the significantly altered life and work circumstances due to government restrictions during the pandemic in Germany and on previous research, we propose the following hypothesis:

H1. The SWB of solo self-employed individuals and employees in Germany declined during the pandemic.

Cross-national comparative studies show that the self-employed generally have higher SWB than employees (e.g., Johansson Sevä et al., 2015; Nordenmark et al., 2023; Yue & Cowling, 2021). This is usually attributed to the entrepreneurial opportunities, greater autonomy, and flexibility of self-employment (Binder, 2017; Binder & Coad, 2012). However, self-employment also brings inherent risks, such as income instability and job insecurity (Binder, 2017; Binder & Coad, 2012). Notwithstanding these risks, studies provide evidence for greater SWB among the self-employed compared with employees (e.g., Johansson Sevä et al., 2015; Nordenmark et al., 2023; Yue & Cowling, 2021). During the pandemic, many of the typical advantages of self-employment, such as flexibility and autonomy, were severely constrained by lockdowns and government restrictions, while the negative aspects—particularly financial instability—became more pronounced. Besides the adverse effects on income, there were also clear negative effects on the SWB of the self-employed. Compared with employees, the self-employed—and the solo self-employed in particular—were more frequently impacted by subjective factors such as the heavy burden of their work situation, financial pressures, and concerns regarding their professional future (Schulze Buschoff & Emmmler, 2021). Furthermore, research findings indicate that the mental health of the self-employed deteriorated more than that of employees, and that their life satisfaction declined more sharply (Caliendo et al., 2022; Kritikos et al., 2020; Torrès et al., 2022; Jaschke et al., 2023). This means that, in addition to the greater financial hardships during the pandemic, there were differences in subjective perceptions, such as stress and worries, which were more pronounced among the self-employed, especially the solo self-employed (Kritikos et al., 2020; Schulze Buschoff & Emmmler, 2021).

A comparison of the SWB of the self-employed and employees in the EU-27 countries during the pandemic (Nordenmark et al., 2023) suggests that the different welfare systems—and thus the different levels of social security protection for the self-employed—could be responsible for differences in SWB between these two groups. In the Nordic countries (e.g., Denmark, Finland, Sweden), whose welfare systems differ from those of countries such as Germany, smaller differences in SWB were observed between the self-employed and employees. In Germany, the self-employed appear to have been significantly more affected by the crisis than employees, which also translated into greater decreases in their SWB during the first months of the pandemic (Kritikos et al., 2020; Zoch et al. 2021). Considering the different dynamics and protection measures during the pandemic in Germany and their heterogeneous impact on the burdens experienced by the solo self-employed and employees, we hypothesize:

H2. The decline in SWB during the pandemic in Germany was more severe among the solo self-employed than among employees.

Previous research on SWB during the pandemic has focused predominantly on the first year after the outbreak. By contrast, the present study also incorporates data from 2022, a period when many restrictions aimed at curbing the spread of the virus had been lifted and a gradual return to normalcy was underway, and 2023, when the majority of pandemic-related restrictions had been lifted for nearly a year, which might have helped to level out any negative impacts on SWB. However, the pandemic may have had lasting effects on SWB due to prolonged economic insecurity, lingering health issues, weakened social ties, and deep-seated psychological scars that continued to affect it long after restrictions have been lifted. Furthermore, this period was marked by multiple crises, including Russia's war against Ukraine and rising energy prices and inflation rates. This raises the question of whether SWB showed signs of recovery in 2022 and 2023, or whether the lingering effects of the pandemic and the multiple other crises continued to have a detrimental effect.

4 Data and Method

4.1 Data and Sample

Our analyses are based on data from the German Panel Study Labour Market and Social Security (PASS) conducted by the Institute for Employment Research (IAB) (Trappmann et al., 2019). PASS is an annual large-scale nationally representative panel survey that collects household- and individual-level data. The target population comprises all private households in Germany. In addition to a representative general population sample, PASS includes a sample of welfare benefit recipients. As we were interested in SWB, including satisfaction with employment, we restricted the sample to employed and self-employed respondents. PASS data are collected using a mix of computer-assisted telephone interviewing (CATI) and computer-assisted personal interviewing (CAPI). The large sample size allows for detailed analyses of the employment histories of self-employed workers and employees. The panel data include information on respondents' sociodemographic and employment characteristics and their satisfaction with certain life domains. The longitudinal nature of the data enables the depiction of changes over time—also during the pandemic.

To capture how SWB trajectories evolved during the pandemic compared with pre-pandemic levels, we drew on data from Waves 13–17 (2019–2023). To interpret the results on the development of SWB during this period, it is essential to know what pandemic-related measures were in place at the time of the respective surveys and to consider how they may relate to our findings. Table A1 in the Online Appendix displays the percentage of interviews conducted in each month for each survey year. PASS interviews are usually conducted between February and April each year. The share of interviews conducted during those months ranged between 44% in 2023 and 84% in 2021. Therefore, variances due to different interview time points should not influence our results. In 2020 (Wave 14), nearly half of the respondents took part in the survey between February and April. In March 2020, as COVID-19 infection rates increased in Germany, government measures were implemented to curb the spread of the virus. On March 22, lockdown measures and contact restrictions were announced, which led to the closing of businesses and schools. The services sector, in which a significant number of solo self-employed individuals work, was particularly impacted. Restrictions were gradually eased in May 2020. Thus, some respondents were

interviewed before and others after the first lockdown came into force. However, as the pandemic was already salient in the news and already impacted individuals' behavior, there should be no difference between the SWB of respondents interviewed in February and those interviewed in March or April.⁴

In 2021, 84% of the interviews were conducted between February and April—56% in March alone. In November 2020, a partial lockdown was implemented, which had evolved into a stricter lockdown by mid-December 2020. These measures were repeatedly extended. At the beginning of March 2021, shops and close-contact services were permitted to reopen, subject to strict hygiene protocols. However, on March 22, due to high infection rates, the lockdown was extended until April 18, 2021. This marked the final lockdown, although the overall pandemic situation remained uncertain. In 2022, the majority of PASS respondents were interviewed between February and April; again, over half of the interviews (54%) were conducted in March. At the beginning of 2022, the number of infections was high. However, due to widespread vaccination and increased testing, no new lockdown measures were implemented. In November 2021, the measures were reduced to proof of 2G status (vaccinated or recovered), 2G+ status (vaccinated or recovered+negative COVID-19 test), or 3G status (vaccinated, recovered, or tested), together with the obligation to wear a face mask. By April 2022, the only remaining requirement was to wear an FFP2 mask on public transport and in healthcare facilities and retirement homes. Hence, this was a fading-out period, where most of the major restrictions had been lifted. The PASS survey conducted in 2023 (Wave 17)—the most recent survey in our dataset—thus serves as a first observation after most pandemic measures had been lifted for nearly a year.

We limited our analyses to employees and self-employed individuals aged 18–65 years. To ensure comparability of work hours and monthly wages, we excluded individuals in marginal employment (*Minijobber*), and those with “minijobs” in addition to their main employment, thereby reducing the sample by 6.7%. In addition, as the group of self-employed is highly heterogeneous and our focus was on the solo self-employed, we excluded all self-employed respondents with employees (3%). Furthermore, we excluded contributing family workers and farmers, due to the difficulty of comparing these groups of self-employed persons (e.g., Binder, 2017). The solo self-employed in our sample could be members of the liberal professions or other solo self-employed persons.⁵ As SWB can be driven by employment changes, we also excluded individuals who had changed their employment status during the observation period (12.3%). Our aim in so doing was to ensure that differences in SWB between the solo self-employed and employees were not due, for example, to switches out of self-employment into dependent employment or unemployment (Binder, 2017; Binder & Coad, 2012).⁶ After listwise deletion of missing values (4.7%), the final sample comprised 7,152 individuals and encompassed 17,060 person-years, with 506 solo

⁴ A comparison of the SWB of respondents who participated in February with that of respondents who participated in March showed that it did not differ statistically significantly between these groups.

⁵ Additional sensitivity analyses showed that solo self-employed members of the liberal professions and other solo self-employed individuals did not differ in their SWB development during the observation period. See Table A3 and Fig. A2 and A3 in the Online Appendix.

⁶ The transition matrix shows that the prevalence of switches was comparable at each time point, and that only a small percentage of respondents (8.5% of solo self-employed and 3.8% of employees) experienced a change in employment status during the observation period. Sensitivity checks confirmed that results remained substantively unchanged when these individuals were included (see Online Appendix Table A4).

self-employed respondents encompassing 968 person-years and 6,646 employees with 16,092 person-years.

4.2 Variables

4.2.1 Dependent Variables

SWB is a broad concept that includes, for example, general life satisfaction, satisfaction with specific domains (e.g., family, health, employment), and emotional responses to life events (Diener et al., 1999, 2018). To measure SWB, we used two indicators: general life satisfaction and job satisfaction. Differentiating between life satisfaction and job satisfaction is essential, as the two constructs reflect distinct yet interrelated dimensions of SWB and might have been differentially impacted by the pandemic. General life satisfaction reflects contentment across multiple domains (e.g., family, health, work), thus providing a comprehensive view of individuals' general well-being. It is a well-researched construct commonly used in the literature as one central aspect of SWB (e.g., Bähr et al., 2022; Patzina et al., 2023). Furthermore, research has highlighted that it is a rather stable measure (e.g., Diener et al., 1999). Figure A1 in the Online Appendix displays the life satisfaction trajectories of solo self-employed respondents and employees over the 10 years from 2013 to 2023 (PASS Waves 7–17). Between 2013 and 2019, life satisfaction was rather stable and there were no differences between the trajectories of solo self-employed respondents and employees. However, a stark decrease in life satisfaction was observed in the years that followed, highlighting how severely the pandemic impacted both the solo self-employed and employees. Job satisfaction focuses explicitly on the employment situation, which was strongly impacted by the pandemic and can thus shed light on a more specific component of SWB. Previous studies have indicated that solo self-employed individuals tend to have higher job satisfaction than employees (Binder, 2017). Therefore, it was crucial to thoroughly analyze the possible impact of the pandemic on this component of the SWB of self-employed individuals and employees. In PASS, both variables are self-assessed on an 11-point scale ranging from 0 (*Completely dissatisfied*) to 10 (*Completely satisfied*). The indicators can be treated as quasi-metric, as the results are comparable with those of ordinal models (Ferrer-i-Carbonell & Frijters, 2004).

4.2.2 Independent Variables

The key distinction in our analyses was the differentiation between the solo self-employed and employees (i.e., persons who have a work contract with an employer). We controlled for individual characteristics that have been shown to be associated with SWB (e.g., Binder, 2017; Kriechel et al., 2024) and might have acted as potential confounders if not accounted for. We control for the logarithm of individual gross monthly income in our models, as it is likely correlated with both employment status and life satisfaction. Including this variable helps to isolate the association of interest by accounting for shared variance. In this context, individual income may function as a suppressor variable—clarifying the relationship between solo self-employment and life satisfaction by removing confounding variance linked to income disparities. We emphasize that this is a statistical adjustment aimed at improving estimate precision, not a causal test of underlying mechanisms. We also con-

trolled for family status, operationalized with two binary variables: children under 15 years living in the household (0=no children or children older than 15) and relationship status (0=single). Family status might have influenced both SWB and the decision to become self-employed, especially during the pandemic, when the home environment became crucial for recreation and social relationships but might also have served as a potential stressor, for example, when working from home while having to take care of children. Third, we controlled for work hours, as they have been shown to be associated with both SWB and self-employment (Binder, 2017; Johansson Sevä et al., 2015). Additionally, the pandemic led to shifts in labor demand, increasing work hours for some while drastically reducing them for others, which likely impacted SWB. Relatedly, due to widespread demand shortages, the German government provided replacement benefits, such as the short-time working allowance for employees and support programs specifically for the self-employed, for example, the Restart Assistance Program (Neustarthilfe-Programm). Therefore, we controlled for receipt of such pandemic-related financial support, as it would have provided some social protection against economic hardship, and for receipt of social welfare benefits. Finally, models included a control for the observation year. Descriptive statistics can be found in Table A2 in the Online Appendix.

4.3 Estimation Strategy

Using the panel structure of PASS, we estimated regression models with individual-level fixed effects. This allowed us to focus on within-person changes in SWB over time, as the estimated coefficients are based solely on within-person variance. The fixed-effects framework accounts for the time-invariant effects of any time-constant variable (Rabe-Hesketh & Skrondal, 2012; Wooldridge, 2010). Hence, applying individual-level fixed effects accounts for all observed and unobserved time-constant characteristics (e.g., gender or migration background), thereby controlling for unobserved heterogeneity deriving from these characteristics (Allison, 2009). As described above, we controlled for several time-varying characteristics that have been shown to be associated with SWB and self-employment and might have been especially relevant during the pandemic (Online Appendix Table A2). H1 postulated that both solo self-employed individuals and employees in Germany experienced a decline in SWB during the pandemic. To test this, we estimated fixed-effects regression models to track changes in life satisfaction and job satisfaction across different pandemic stages (2020–2023), separately for solo self-employed respondents and employees. To test H2, which postulated that the decline in SWB during the pandemic was more severe among solo self-employed individuals than employees, we extended our analysis by including in the fixed-effects regression models an interaction term between survey year and employment status (0=employee). This allowed us to assess whether the pandemic had a disproportionately negative impact on the solo self-employed. To account for the repeated observations of individuals over time, we clustered standard errors at the individual level.

5 Results

5.1 SWB Trajectories of Solo Self-Employed Respondents and Employees 2019–2023

Table 1 shows that employees (Model 1) and solo self-employed respondents (Model 2) experienced a decline in life satisfaction compared with 2019, with decreases persisting from survey year to survey year, including 2023. This indicates that even one year after most pandemic-related restrictions had been lifted, neither group had regained their pre-pandemic life satisfaction levels. However, the coefficients differed in size, suggesting that the impact of the pandemic varied at different time points.

To better illustrate changes in life satisfaction over time, Fig. 1 displays the life satisfaction of solo self-employed respondents and employees between 2019 and 2023.⁷ At the beginning of the pandemic, in 2020, the impact on employee's life satisfaction was only marginally negative ($b = -0.075$, $p = 0.002$). This aligns with prior research suggesting that the decline in SWB during the initial phase of the pandemic was relatively moderate (e.g., Bähr et al., 2022; Patzina et al., 2023).

The starkest decrease was observed in 2021, when employees' life satisfaction decreased by -0.423 points ($p = 0.000$) compared with 2019 and by -0.347 points ($p = 0.000$) compared with 2020.⁸ This is consistent with previous research indicating that mental health declined most severely in 2021 (Patzina et al., 2024). Employees' life satisfaction showed a

Table 1 Fixed-effects regression results for life satisfaction and job satisfaction by employment type (2019–2023)

	Life satisfaction				Job satisfaction			
	Model 1		Model 2		Model 3		Model 4	
	Employees		Solo self-employed		Employees		Solo self-employed	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Survey year (Ref. 2019)								
2020	-0.075**	0.025	-0.335**	0.123	0.001	0.036	-0.022	0.152
2021	-0.423***	0.028	-0.698***	0.145	-0.159***	0.038	-0.427*	0.198
2022	-0.325***	0.028	-0.483***	0.141	-0.267***	0.042	-0.204	0.177
2023	-0.267***	0.033	-0.401*	0.162	-0.359***	0.049	-0.055	0.197
Constant	6.243***	0.493	5.871***	0.684	4.511***	0.788	5.313***	1.046
<i>N</i> person-years	16,092		968		16,092		968	

Note: Controlled for: relationship status, children under 15 years living in household, weekly work hours, log monthly individual gross income, receipt of pandemic-related government aid, receipt of social welfare benefits. Clustered robust standard errors. Standard errors in second column

Authors' own calculations based on data from PASS Waves 13–17

* $p < 0.10$ ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$

⁷ Confidence intervals are not shown in Figs. 1 and 2, as they serve solely to illustrate the regression results reported in Table 1, where statistical significance was tested for within-group changes compared with 2019. Figures 1 and 2 are not intended to imply group comparisons, which require interaction terms and are addressed in Sect. 5.2. Including confidence intervals at this stage could have misleadingly suggested that such comparisons had been conducted.

⁸ We performed additional tests to explore whether differences between each survey year were statistically significant.

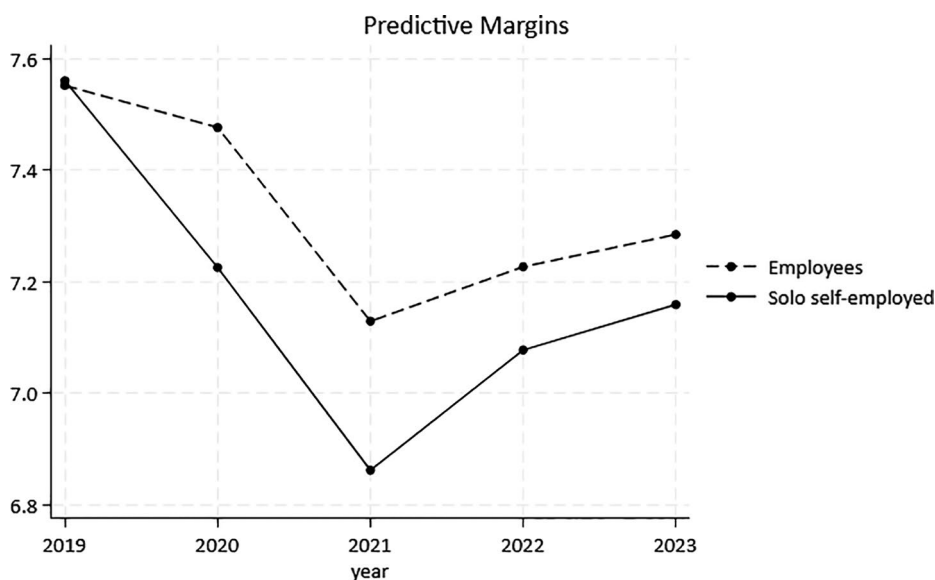


Fig. 1 Life satisfaction of employees and solo self-employed respondents, 2019–2023. Note: Based on Models 1 and 2 in Table 1. Own calculations based on data from PASS Waves 13–17. 95% confidence intervals. Controlled for: relationship status, children under 15 years living in household, weekly work hours, log monthly individual gross income, receipt of pandemic-related government aid, receipt of social welfare benefits

slow recovery in 2022 ($b=0.097$, $p=0.000$) and 2023 ($b=0.156$, $p=0.000$) compared with 2021. However, life satisfaction was still statistically significantly lower compared with pre-pandemic levels in 2019. This persistent decrease in life satisfaction highlights the enduring negative effects of the pandemic, even as some aspects of daily life returned to normal.

For solo self-employed respondents, the decline in life satisfaction seems to have been more severe as early as 2020 ($b=-0.335$, $p=0.007$), when it was four times greater compared with employees. This sharp decline persisted in 2021, when life satisfaction was -0.698 points ($p=0.000$) lower compared with 2019 and -0.363 points ($p=0.004$) lower than in 2020. As in the case of employees, life satisfaction among the solo self-employed reached its lowest level in 2021 and appears to have recovered in 2022 and 2023 compared with 2021, although levels remained statistically significantly lower than in 2019. Therefore, the results for solo self-employed respondents, too, suggest a moderate recovery in life satisfaction, but with statistically significant differences compared with pre-pandemic levels.

Taken together, the results for the development of general life satisfaction among solo self-employed respondents and employees supports H1, which postulated that the SWB of both employment groups in Germany declined during the pandemic. Notably, the decline in life satisfaction was most pronounced in 2021 compared with the initial decline observed from 2019 to 2020. The results underscore the profound impact of the pandemic on people's lives, as life satisfaction—typically a stable measure—was significantly altered by this unprecedented event. Hence, the ongoing restrictions and vast disruptions of people's lives took a toll on their life satisfaction, with persistent consequences that were still observable in 2023, when most COVID-19 related measures had been lifted for almost a year. However,

the years 2022 and 2023 were also marked by other crises, such as Russia's war against Ukraine and rising energy prices and inflation rates, which might also explain the lower levels of life satisfaction.

Models 3 and 4 in Table 1 show the development of job satisfaction among employees and solo self-employed respondents. In the initial phase of the pandemic in 2020, there seems to have been no statistically significant impact on the job satisfaction of either group. Figure 2 displays the job satisfaction trajectories based on the results in Table 1. The overall pattern of job satisfaction mirrors that of life satisfaction, as evidenced by a sharp decline in 2021, one year into the pandemic. Specifically, job satisfaction among solo self-employed respondents decreased by -0.427 points ($p=0.031$) compared with 2019, which is almost three times higher than the decrease among employees ($b=-0.159$, $p=0.000$).

For the solo self-employed, a notable recovery was observed in 2022 and 2023, with job satisfaction levels no longer being statistically significantly different compared with 2019. Hence, solo self-employed individuals had largely regained their pre-pandemic levels of job satisfaction by 2022.

As in the case of the solo self-employed, no statistically significant changes in job satisfaction were observed for employees in 2020 compared with the previous year. However, in 2021, job satisfaction among employees decreased by -0.159 points ($p=0.000$) compared with 2019. Unlike the solo self-employed, who showed a recovery in job satisfaction in 2022, employees' job satisfaction continued to decline. By 2022, it was 0.267 points ($p=0.000$) lower than in 2019, and it declined further in 2023 ($b=-0.091$, $p=0.000$), reflecting a persistent downward trajectory. By contrast, the job satisfaction of the solo self-employed respondents recovered in 2022, likely due to the lifting of COVID-19 restrictions,

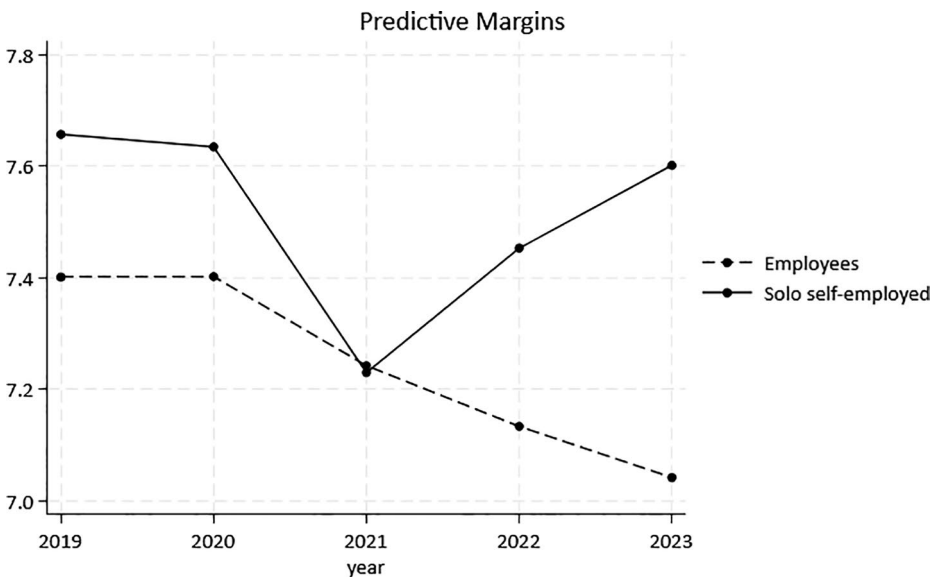


Fig. 2 Job satisfaction of employees and solo self-employed respondents, 2019–2023. Note: Based on fixed-effects regression models (Table 2, Models 1 and 2). Own calculations based on data from PASS Waves 13–17. 95% confidence intervals. Controlled for: relationship status, children under 15 years living in household, weekly work hours, log monthly individual gross income, receipt of pandemic-related government aid, receipt of social welfare benefits

which may have improved their outlook on business prospects and employment stability. This recovery aligns with pre-pandemic research (Binder, 2017), which found that solo self-employed individuals reported higher job satisfaction compared with employees. Although that gap narrowed in 2020 and 2021, it reemerged in 2022 and 2023 as the job satisfaction of solo self-employed respondents returned to pre-pandemic levels.

The findings indicate that the pandemic had a negative impact on the job satisfaction of both solo self-employed individuals and employees, thus supporting H1. However, the trajectories of job satisfaction differed between these groups. The solo self-employed experienced the most significant decline in 2021, followed by a gradual recovery in 2022 and 2023, whereas employees experienced a persistent downward trend. This divergence underscores the varying effects of the pandemic across different labor market groups. Moreover, a comparison of the declines in life satisfaction and job satisfaction suggests that the pandemic had a more detrimental effect on life satisfaction.

5.2 Did the Life Satisfaction and Job Satisfaction Trajectories of the Solo Self-Employed and Employees Differ During the Pandemic?

To explore whether the solo self-employed were more negatively affected than employees in terms of life satisfaction and job satisfaction, we estimated fixed-effects regression models including an interaction term between survey year and self-employment (0=employee). Table 2 displays the results for life satisfaction (Model 1) and job satisfaction (Model 2).

As indicated by the statistically significant interaction terms in Table 2, the solo self-employed experienced greater declines in life satisfaction in 2020 and 2021 compared with employees. To better illustrate this, Fig. 3 presents conditional marginal effects plots derived

Table 2 Fixed-effects regression results for life satisfaction and job satisfaction accounting for difference in employment type (2019–2023)

	Life satisfaction		Job satisfaction	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Survey year (Ref. 2019)				
2020	-0.077**	0.025	0.007	0.036
2021	-0.425***	0.028	-0.152***	0.038
2022	-0.329***	0.028	-0.260***	0.041
2023	-0.272***	0.031	-0.349***	0.048
Employment type (Ref. employee)				
Solo self-employed	-1.716***	0.206	3.759***	0.267
Interaction term				
Solo self-employed*2020	-0.212 ⁺	0.111	-0.131	0.150
Solo self-employed*2021	-0.239 ⁺	0.143	-0.358 ⁺	0.195
Solo self-employed*2022	-0.125	0.130	-0.037	0.172
Solo self-employed*2023	-0.076	0.156	0.207	0.190
Constant	6.213***	0.398	4.564***	0.641
<i>N</i> person-years	17,060		17,060	

Note: Controlled for: relationship status, children under 15 years living in household, weekly work hours, log monthly individual gross income, receipt of pandemic-related government aid, receipt of social welfare benefits. Clustered robust standard errors. Standard errors in second column

Own calculations based on data from PASS Waves 13–17

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

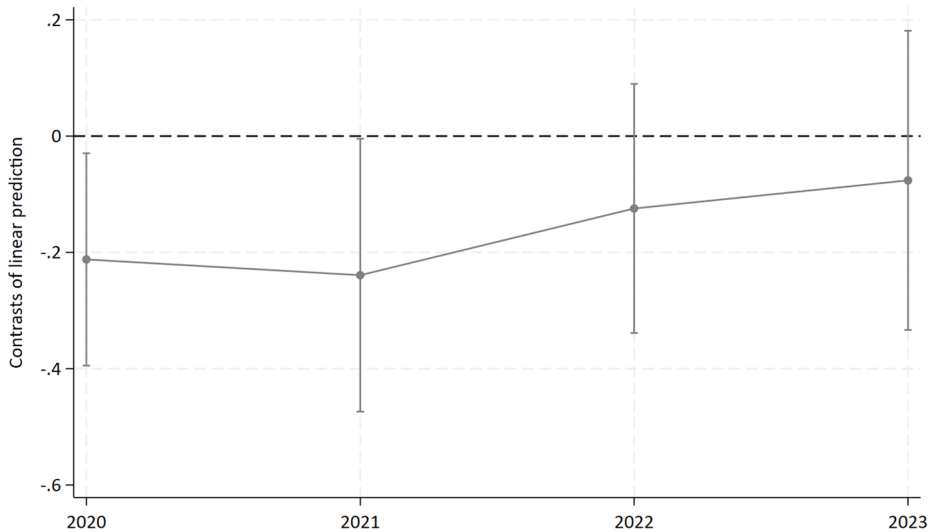


Fig. 3 Differences in changes in life satisfaction between the solo self-employed and employees, 2019–2023. Note: Based on Model 1 in Table 2. Own calculations based on data from PASS Waves 13–17. 90% confidence intervals (CIs). Controlled for: relationship status, children under 15 years living in household, weekly work hours, log monthly individual gross income, receipt of pandemic-related government aid, receipt of social welfare benefits

from Model 1 in Table 2. These plots show whether the decline between 2019 and subsequent observation points differed statistically significantly between solo self-employed respondents and employees, thus indicating which group was more affected. If the confidence intervals cross zero (dashed line), the differences were not statistically significant at the 90% confidence level.

Figure 3 shows that from 2019 to 2020, the life satisfaction of the solo self-employed decreased to a greater extent ($b = -0.212$, $p = 0.056$) than that of employees. This trend persisted in 2021, when the solo self-employed experienced more negative impacts on their life satisfaction compared with 2019 ($b = -0.239$, $p = 0.094$) than did employees. As indicated by the statistically insignificant interaction term in Model 1 in Table 2, there were no differences between the life satisfaction trajectories of the two groups in 2022 or 2023.

Figure 4 illustrates the conditional marginal effects plots derived from Model 2 in Table 2. As the confidence intervals crossed zero (dashed line), there was no difference in the impact of the pandemic on job satisfaction among the solo self-employed in 2020 compared with employees. In 2021, the decline in job satisfaction was considerably steeper for the solo self-employed ($b = 0.358$, $p = 0.066$). However, after 2021, there were no statistically significant differences in job satisfaction trajectories between the two groups.

Overall, our findings support H2, which posited that the decline in SWB during the pandemic in Germany was more severe among the solo self-employed than among employees. However, the steeper decline in SWB among the solo self-employed in 2021 was not a lasting trend but disappeared in 2022, when pandemic-related restrictions were gradually eased, and in 2023, when they had been lifted for nearly a year.

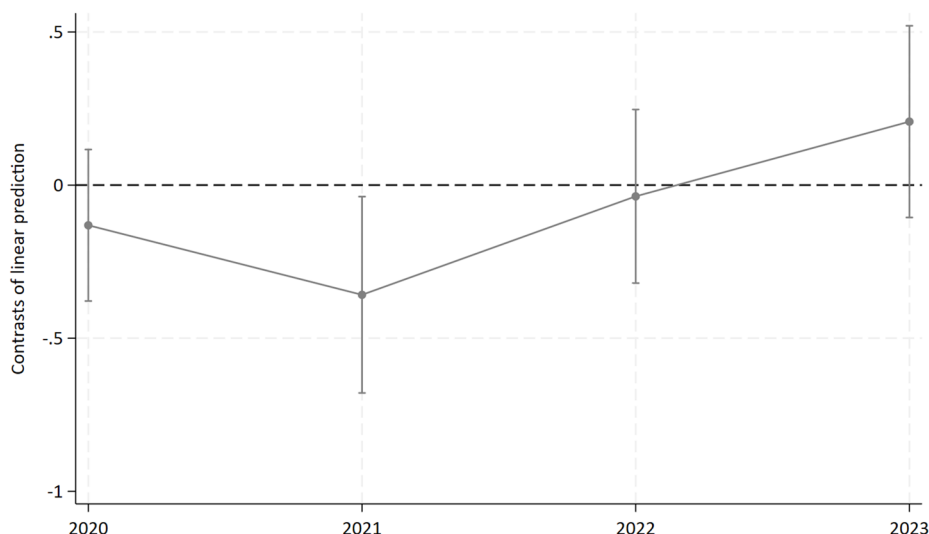


Fig. 4 Differences in changes in job satisfaction between the solo self-employed and employees, 2019–2023. Note: Based on Model 2 in Table 2. Own calculations based on data from PASS Waves 13–17. 90% confidence intervals (CIs). Controlled for: relationship status, children under 15 years living in household, weekly work hours, log monthly individual gross income, receipt of pandemic-related government aid, receipt of social welfare benefits

5.3 Sensitivity Analyses

We performed several sensitivity checks to ensure the validity of our core findings (detailed results available upon request). First, we re-estimated our models by replacing individual gross monthly income with household net income to account for broader financial resources available to respondents. While household income better captures the material living conditions within a household—including partner income and public transfers—it is less directly linked to the respondent’s employment status. In this alternative specification, the interaction effects between survey year and solo self-employment on life satisfaction (Table 2, Model 1) became statistically insignificant when household income was included instead of individual income. This suggests that individual income plays a key statistical role in differentiating the life satisfaction trajectories of solo self-employed individuals and employees, and that excluding it may obscure relevant variation related to income disparities. In contrast, results for job satisfaction (Table 2, Model 2) remained robust regardless of whether individual or household income was controlled for. Overall, these findings underscore the importance of how income is operationalized in models of subjective well-being: individual income helps clarify employment-related differences in life satisfaction, whereas household income may reflect compensatory resources that buffer financial strain and attenuate observed group differences.

Especially during the pandemic, when external childcare was limited, individuals who shouldered childcare responsibilities might have experienced greater decreases in SWB. As the solo self-employed usually have greater work flexibility and autonomy, it might have been easier for them to reconcile increased childcare demands with work responsibilities. However, accounting for childcare responsibilities did not change our core findings on

SWB. Furthermore, controlling for education and for age from 18 to 65 years measured in 5-year intervals confirmed our core findings. Excluding actual weekly work hours from the models did not change our core findings.

6 Conclusion

This study aimed to explore how the COVID-19 pandemic impacted SWB—operationalized as life satisfaction and job satisfaction—among the solo self-employed and employees in Germany. Although previous research has examined the immediate effects of the pandemic, there has been little research on its medium-term consequences, on whether SWB recovered or continued to deteriorate as the pandemic unfolded, and on what happened after the gradual lifting of restrictions and return to normalcy. By leveraging nationally representative longitudinal data covering the years 2019 to 2023, this study extends prior research by capturing the entire course of the pandemic, from its onset, through its peak, to its eventual decline. We focused specifically on the solo self-employed, a group that tends to face greater financial precarity and that was particularly vulnerable to the economic disruptions caused by the pandemic (Schulze Buschoff & Emmmler, 2021). During the pandemic, the usual advantages of self-employment, such as flexibility and independence, were greatly limited by lockdowns and government restrictions, while the negative aspects, particularly financial instability, became more prominent. This was reflected in heightened psychological stress, with this group reporting increased concerns about financial security and worsened mental health (Caliendo et al., 2022; Peters & Schulze Buschoff, 2025).

Our findings show that the SWB of both solo self-employed individuals and employees declined significantly during the pandemic. Notably, the initial decline in life satisfaction was more pronounced than the decrease in job satisfaction. This suggests that the broader life challenges posed by the pandemic, such as health concerns, social restrictions, and financial uncertainty, may have impacted overall well-being more than job-related well-being. More specifically, we found that with the onset of the pandemic in 2020, declines in life satisfaction were moderate, and job satisfaction did not appear to be affected by the pandemic-related restrictions. A substantial decline in both life satisfaction and job satisfaction became evident in 2021 among employees and the solo self-employed. This is in line with first evidence in Germany showing that the adverse effects of the pandemic on loneliness, depression, mental health, and SWB intensified over the course of the pandemic (Benke et al., 2022; Entringer & Kröger, 2021; Kriechel et al., 2024; Patzina et al., 2024). Further, our results suggest that the solo self-employed were disproportionately more negatively affected by the pandemic in terms of life satisfaction. The decline in their life satisfaction was steeper in 2020 and in 2021, which marked the lowest level of life satisfaction during the observation period. Turning to the results on job satisfaction, we also detected substantial differences between the two groups. In line with previous research (Binder, 2017), the solo self-employed had higher job satisfaction levels than employees before the pandemic, but this gap closed in 2021. Although both groups experienced lower job satisfaction compared with pre-pandemic levels, solo self-employed individuals' job-satisfaction decreases were three times higher compared with those of employees. Hence, during the first year after the outbreak of the pandemic (2020–2021), the solo self-employed experienced a more severe decline in SWB than employees.

Furthermore, as we explored SWB trajectories up to and including 2023, when government restrictions had already been lifted, vaccinations were widely available, and life gradually returned to normalcy, our results provide insights into how SWB developed during the fading-out period. Life satisfaction for both groups increased moderately after 2021. Thus, the fading out of the pandemic and the lifting of restrictions had a positive effect on the life satisfaction of the solo self-employed and employees. However, the life satisfaction of both groups remained substantially lower than pre-pandemic levels, which suggests a slow recovery.

Surprising differences in job satisfaction emerged between employees and the solo self-employed. Whereas employees' job satisfaction continued to decline in 2022 and 2023, that of the solo self-employed appears to have recovered by 2022. This highlights the importance of exploring different components of SWB, as their dynamics may differ. These results are in line with those of a study analyzing feelings of stress and concerns about the future of their employment among self-employed individuals and employees in Germany from April 2020 to July 2023 (Peters & Schulze Buschoff, 2025). It found that in the period April 2020–April 2022, the self-employed experienced higher levels of stress due to their work situation and more worries about their professional future compared with employees. However, whereas stress and worries decreased for the self-employed during that period, employees' stress and worries increased and were more pronounced as of April 2022. One explanation could be the higher resilience of the self-employed and the reemergence of the positive aspects of self-employment, such as autonomy and flexibility, which are important drivers of job satisfaction among the self-employed (Binder, 2017). By contrast, employees were better protected than the self-employed against income losses and unemployment during the pandemic thanks to the short-time work allowance, which probably cushioned the decline in job satisfaction levels. However, in 2022, dramatic increases in inflation, supply bottlenecks, and uncertainties slowed down the German economy and possibly decreased employees' job satisfaction due to uncertainty and stagnating wages. Future research should therefore further investigate why the job satisfaction trajectories of the solo self-employed and employees differed during the observation period.

Our analyses clearly show how SWB varied throughout the pandemic. Relatedly, previous research analyzing data from the bi-annual German Family Demography Panel Study (FReDA) showed that SWB exhibited dynamic patterns of change during the pandemic and beyond, driven by the multiple crises faced by the population (Kriechele et al., 2024). To fully understand the impact of COVID-19 and concurrent crises—such as Russia's war against Ukraine—it is thus crucial to consider the exact timing of the surveys, the pandemic-related measures in place at that time, the severity of infection waves, and the presence of additional crises (e.g., rising inflation rates). Accounting for these factors ensures a more accurate interpretation of SWB trends and broader societal impacts.

Despite these insights, this study has certain limitations. First, we could not sufficiently account for the heterogeneity within the group of solo self-employed, which may have led to different SWB trajectories for different industries and occupations. Future research should therefore investigate how the pandemic affected SWB among groups of solo self-employed workers that differed in terms of their income and precarity. Similarly, future research should examine differences between various categories of self-employment, such as solo self-employed versus self-employed with employees, as well as opportunity-driven versus necessity-driven self-employment.

Second, in our analyses, we did not differentiate by gender. However, a comparison by gender could shed light on gendered dynamics in SWB during the pandemic. Studies show that during the pandemic, women were generally more negatively affected in their SWB compared with men (Patzina et al., 2023), and that self-employed women were more affected in terms of financial losses than were their male counterparts (Graeber et al., 2021; Seebauer et al., 2021). Therefore, future research should consider the gendered impact of the pandemic on SWB among the self-employed. As women are more often solo self-employed, this heterogeneity should also be considered to achieve more in-depth insights into how the pandemic affected female self-employed persons.

Despite these limitations, this study provides novel insights into how the SWB of the solo self-employed and employees in Germany evolved during and after the pandemic. The findings offer a more nuanced understanding of how different employment groups were affected, emphasizing the crucial role of individual income in explaining differences in life satisfaction. Rather than self-employment alone driving disparities between the two groups, income stability was a key factor. These insights are particularly relevant for shaping future policy measures to mitigate the long-term effects of the pandemic and to improve crisis response strategies. While government support programs for the self-employed, such as the Immediate Assistance Program and the Restart Assistance Program, provided temporary relief, they were limited in scope and duration and often hindered by bureaucratic hurdles (David et al., 2022; Grabka, 2021; Kritikos et al., 2022). The inadequacy of these measures likely contributed to the significant decline in SWB among solo self-employed individuals. Strengthening social protections for the self-employed—such as better integration into social security systems—could help alleviate financial uncertainty and existential risks, ultimately buffering some adverse effects on life satisfaction.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s11205-025-03640-8>.

Data Availability The PASS data are available to researchers at <https://fdz.iab.de/en/our-data-products/individual-and-household-data/pass/>.

Declarations

Conflict of Interest The authors declare that there are no conflicts of interest.

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