1 Introduction

Imagine twin brothers who live together in a comfortable home. One day, one of them has been confined to a tiny, dirty prison cell and then a month later, he was relocated to a larger, cleaner cell. At the same time, the other brother got placed in the larger cleaner cell directly. While both brothers ultimately ended up in the same place, the former is likely to be much happier than the second one due to the relative improvement in his situation, while the latter may feel a sense of loss or sadness, highlighting the critical role that reference points play in shaping our perceptions of well-being. Here, their happiness levels are different for a while even though they share the same absolute conditions. We believe a similar phenomenon can be observed in the relation between happiness and economic recessions.

Happiness is a complex and multifaceted construct that has gained significant attention in both psychological and economic research. In economic studies, self-reported happiness is getting more popular steadily, since it is a simpler alternative measure and incorporates psychological and emotional factors, in comparison to the traditional utility measures. Happiness varies with both internal and external factors, it is influenced by perception as much as reality, it is adaptive and relatively difficult to assess. In this paper we will use **Subjective Well-Being (SWB)** which is the scientific term for self-reported happiness and life satisfaction as the measurement of well-being.

In these numerous variations of happiness dynamics, the relationship between happiness or individual well-being in general and external circumstances, particularly during and after recessions, is an intriguing area of study. Each economic recession creates its own set of channels through which negative shocks such as job market disruptions, decline in purchasing power, loss of savings and investments or food insecurity reach individuals and eventually, people go through a period of mental difficulties and social unrest. It would not be bold to assume that one's perception of own happiness or life satisfaction declines during such time. However, instead of the adverse effect of recessions, we pursue a different angle in this area of interest. This paper explores the hypothesis that post-recession happiness levels temporarily surpass those during the economic stability period driven by shifts in their reference points, meaning individuals experience an increase in happiness following the end of a recession. Today's perception becomes more positive when yesterday's experience is poor as a comparison point. We will refer to this effect as **reference driven upswing effect**. One should be aware that it is different from the concept of hedonic adaptation. Hedonic adaptation refers to the long-term mean reversion in happiness levels, while our theory proposes a temporary surge in happiness driven by changing reference points.

There are three main theories regarding the formation of Subjective Well-Being (SWB). The first, the traditional theory, suggests that an individual's SWB is determined by their absolute circumstances, meaning that the better their circumstances—such as being healthier or wealthier—the higher their SWB. The second, the hedonic adaptation theory, posits that an individual's SWB eventually returns to a long-term mean, known as the **"Set Point"** in most of the literature, over time. Moreover, we position the third theory, which argues that happiness is determined by the difference between one's current reality and a reference point. This reference point is influenced by various factors, including comparisons with others in society, such as relative income levels, as well as one's own historical conditions, such as income levels from the previous year. We suggest that for a short time interval starting by the end of recession, happiness levels become even higher than one would expect based on the the improving conditions.

If the absolute conditions theory could fully explain happiness levels, we would no longer observe a significant increase in happiness during the first year after a recession once sufficient control variables are included. If the hedonic adaptation theory also applies, then happiness levels in the first year after a recession should not exceed the set point. However, if we observe that happiness still surpasses the set point even after controlling for relevant variables, it should provide evidence that the reference point theory is at play.

When it comes to the dynamics of perception and comparison, the bulk of the existing literature on happiness has focused on group reference points such as income comparisons among peers or income groups (Luttmer, 2005), (Clark, Frijters, and Shields, 2008), (Blanchflower and Oswald, 2004), (Ferrer-i Carbonell, 2005). Conversely, there has been only a limited exploration of one's past socio-economic state or the state of the surroundings as reference points, particularly in the context of recessions. For instance, McBride (2001) finds out that happiness is negatively affected by one's parents' financial status relative to one's own income.

This paper aims to fill that gap by examining how individuals' happiness levels rebound and exceed the pre-recessions levels after experiencing economic downturns. It has been widely studied by numerous scholarly works that the periods of economic recession have a strong negative effect on well-being levels (Graham and Picon, 2010), (Gonza and Burger, 2017), (Ballas and Thanis, 2022). Though recessions are followed by recovery period for well-being levels, the process itself is somewhat unclear or neglected. There are findings from previous works that hint excess levels of happiness in post-recession periods which cannot be explained sufficiently by variables that we may call "usual suspects" in the given context (Graham and Picon, 2010), (Deaton, 2012). This paper will try to expli-

cate this trend with a hypothesis and an empirical basis.

Economic recessions as a driver of shifts in reference points are chosen for various reasons. Alternative negative shocks, such as loss of family member or friend, physical impairment or psychological trauma have very strong impact on well-being and mostly have permanent effect. Recessions have temporary and milder effects. Also, they last sufficiently long and therefore, our dependent variable is not likely to be distorted by daily variation in happiness, and be notable in a year to year datasets. Economic recession are also ubiquitous, meaning that they affect the population, not just specific groups, though effects may vary. Finally, the recession is measurable, meaning we should be able to easily distinguish them and their power.

To test our theory, utilizing two comprehensive and rich datasets, the European Social Survey (ESS) and the German Socioeconomic Panel (SOEP), we build two different variations of a model; an OLS regression for the former and a Fixed-Effects model for the latter. ESS, a pooled cross-sectional dataset, includes observations from different countries and it is translated to the advantage such as more recessions, more variation in the studied sample and universality. SOEP, on the other hand, is a panel data which enables us to control for unobserved individual-fixed effects that are likely to affect well-being. In both models, we use the Subjective Well-Being (SWB) measures as our dependent variables: we use self-reported individual life satisfaction in both dataset. We also use self-reported happiness in ESS as a further test, though we cannot do the same in SOEP since it does not contain such variable. The SWB is a self-reported measure of well-being, mainly gathered through questionnaires and surveys. It has become more popular recently and is widely used in similar studies.

The outcomes of both regressions demonstrate a significant increase in SWB measures in post-recession that cannot be solely attributed to individual factors or improvements in standard macroeconomic ones. In the first model, the coefficient of the first year after recession is 0.20, while the Fixed-Effects regression results reveal that life satisfaction increases by 0.18 points after an economic downturn. Both models yield very similar results. Moreover, the other variables included in the model deliver expected results with a few exceptions and have similar values in both models. We check robustness of all models using various methods. In general, results are stable and do not change significantly with different sensitivity tests.

This paper makes the following contributions to the field of SWB research. Firstly, this paper employs multiple empirical models to accurately identify the reference-driven upswing effect during the post-recession period. Secondly, based on this phenomenon, we

demonstrate that, in addition to the absolute conditions theory and the hedonic adaptation theory, the reference point theory is also at play. Finally, we test the role of happiness determining individual-specific factors as well as macroeconomic ones, confirm the previous works in literature; and identify moderate differences between life satisfaction and happiness variables.

The structure of the paper is the following: Section 2 is a review of literature divided into parts namely Subjective Well-Being measures and Economic recession, Primary determinants of happiness and Theoretical background. Section 3 describes the data, methodology, results and robustness check for the initial model. The second model's data, methodology, results and robustness check are presented in Section 4. Section 5 includes conclusion and discussion parts.

2 Literature Review

Due to the extensive body of research on happiness across numerous social and biological sciences, a comprehensive review is beyond the scope of this work. However, we have categorized the findings into three main groups. After introducing the reasoning of using Subjective Well-Being measures and the impact of economic recession on them, we will discuss the primary determinants of happiness, which are essential to consider in order to avoid omitted variable bias in subsequent regression analyses. Later we will present trend / observations that are similar in nature to the main thesis of this paper.

2.1 Subjective Well-Being measures and Economic Recession

This paper will heavily rely on the two most common Subjective Well-Being measures: happiness and life satisfaction. It has been determined that SWB measures perform well in terms of seven dimensions of statistical quality: relevance, accuracy, credibility, timeliness, accessibility, interpretability and coherence (OECD, 2013). Tella and MacCulloch (2006) acknowledges that happiness data could contain a significant amount of noise but suggests that the signal-to-noise ratio is often good enough to be useful in empirical research. Binder (2014) proposes that SWB measures capture more broadly the effects of societal change and further claims that non-market factors that are badly-captured by income-measures are directly reflected in SWB measures. It is important to note that Subjective Well-Being measures are useful for some purposes; however, they are the perceptions of individuals' experiences, not utility measures as economists conceive of them. Testing for the reliability of SWB measures, Krueger (2008) finds out that such measures are sufficiently high in reliability to provide informative estimates for most of the studies being undertaken. Kahneman and Krueger (2006) highlights that conventional life satisfaction surveys are influenced by various biases like mood, memory, and context, which may limit their reliability. However, they also state that SWB measures correlate with health outcomes, future behaviors, and physiological factors, demonstrating some validity. SWB measures can be extensively used in policy-making and contribute to national well-being indicies with proper caution.

Although two datasets that we use - European Social Survey (ESS) and German Socio-Economic Panel Data (SOEP) - include measures of life satisfaction, only the European Social Survey (ESS) also provides a happiness variable. To ensure consistency and comparability, we will primarily focus on models using life satisfaction for both datasets. However, we will also run a supplementary regression using the happiness variable from the ESS dataset. This additional analysis aims to enrich the thesis content by offering potential comparison points. Since life satisfaction and happiness are highly correlated, this approach also allows us to explore whether the results align or reveal any subtle

differences. The literature is split between two opposing views regarding the correlation between these two measures. Stutzer and Frey (2008) and Clark and Senik (2011) suggest that life satisfaction and happiness can be used interchangeably. On the other hand, Helliwell JF (2004) suggest that comparison between the life satisfaction results and those from the happiness question reveals certain differences within an overall pattern of significant similarity. These differences align with previous research, which suggests that life satisfaction questions tend to prompt responses that are more reflective of an individual's overall life experience rather than their immediate circumstances or mood. Peiro (2006) finds that while both happiness and life satisfaction are similarly influenced by social conditions, they are affected differently by economic factors. Yet, even the proponents of this view do not assert major discrepancies between life satisfaction and happiness measure. Therefore, we decide to proceed with both of them.

Recent papers that studied the impact of the economic downturns on well-being found out that well-being levels drop in crisis periods ((Deaton, 2012), (Graham and Picon, 2010), (Gonza and Burger, 2017)). Gonza and Burger (2017) show that a negative effect of the economic downturn on SWB transmits mainly through macroeconomic factors and worsening economic conditions during the great recession. Ballas and Thanis (2022) suggest that living in one of the 'crisis countries' has a negative impact on subjective happiness. Gudmundsdottir (2013) analyzed Icelandic happiness data from 2007 and 2009, finding that financial difficulties largely contributed to the decline in happiness scores, while income and unemployment had negligible effects. In general, related literature's findings suggest a deteriorating effect of economic crisis or recessions on happiness levels as expected.

2.2 Direct happiness determinants

Economic Factors: The relationship between income and happiness is nuanced. The Easterlin Paradox suggests that beyond a certain threshold, increased income does not significantly boost happiness (Easterlin, 1974). However, subsequent studies indicate that relative income and perceptions of income inequality are considerably important as happiness determinants. Clark et al. (2008) argue that people derive happiness not just from absolute income but from their income relative to others.

Another dimension of economic-financial factors in the given context includes Altruism/redistribution. Anik, Aknin, Norton, and Dunn (2009) find that spending money on others can lead to greater happiness than spending it on oneself. Aknin, Norton, and Dunn (2009) suggest that people assume poorer people are less happy than they are in fact, meaning there is a perceived happiness cost in earning less then currently.

Social Relationships: Myers (2000), Diener, Seligman, Choi, and Oishi (2018) and others highlight that strong social bonds with family, friends, and community are crucial for well-being. It is generally argued in the literature this aspect is more important once certain income threshold has passed. According to Leung, Kier, Fung, Fung, and Sproule (2011), there is a significant relation between happiness and three types of social capital, namely trust and obligations, information channels, and norms and sanctions. It proposes that further happiness-related works should give importance to not just conventional variables such as income, health or employment, but also social capital variables.

Health: Studies by Diener and Chan (2011) and Dolan, Peasgood, and White (2008) demonstrate that good health is a robust predictor of happiness, advocating for public health interventions to enhance societal well-being. "The evidence suggests that poor health, separation, unemployment and lack of social contact are all strongly negatively associated with SWB".

Education: It is generally accepted that happiness varies with educational status; however, the nature of this relation raises questions. Blanchflower and Oswald (2004) find a positive relation between SWB and the years of education, while Stutzer (2004) suggests a hump-shaped relationship, where happiness initially rises with more years of education, but after reaching a certain point, it begins to decline, peaking somewhere in the middle. Dolan et al. (2008) explain the responsiveness of education to the inclusion of other variables such as income or health to the models by education's significant correlation with them and asserts this could underestimate education's full contribution to well-being.

Unemployment: Other studies like Ohtake (2012) or Winkelmann (2014) show that there is a definite influence of unemployment on happiness. Lelkes (2006) found that being unemployed decreases the probability of a high life satisfaction score (at least 8 out of 10 points) by 19%, and a high overall happiness score by 15%. Moreover, O'Connor (2017) suggests that at the macroeconomic-level, unemployment rate and Gini coefficient played the largest roles in influencing happiness levels in a long period in the USA, which experienced several severe economic and financial crises during this period.

Personality Traits: Personality traits, particularly those in the Big Five model, are significant determinants of happiness. Extraversion and low neuroticism are most strongly associated with higher happiness levels ((DeNeve and Cooper, 1998) (Steel, Schmidt, and Shultz, 2008)). Peterson, Ruch, Beermann, Park, and Seligman (2007) highlight important influence of personality traits like perseverance, gratitude, love, hope, curiosity on happiness in a study on American and Swiss populations.

Societal/Political Influences Environmental factors, including living conditions, climate, and governance, play a critical role in happiness. Helliwell, Layard, Sachs, and De Neve (2020) - The World Happiness Report 2020 find that stable governments, low corruption, and high social trust correlate with higher happiness. Other editions of the same report (2024) also suggest that: age, depending on specific region is correlated with happiness (both ways).

Environmental impact: Additionally, studies by White, Alcock, Wheeler, and Depledge (2013) and MacKerron and Mourato (2013) highlight the positive impact of access to green spaces and favorable climatic conditions on well-being.

Work and Leisure: Job satisfaction and work-life balance are crucial for happiness. Meaningful work and adequate leisure time enhance life satisfaction (Otken and Erben, 2013). Kucel and Vilalta-Bufí (2013) states that well-being depends on a satisfactory work environment, providing autonomy, work challenges and the possibility of promotion.

Our set of control variables also includes age, gender, safety concerns, physical impairments, and trust. Blanchflower and Oswald (2004) and Ferrer-i Carbonell (2005) find a negative relationship between age and SWB and a positive relationship between age squared and SWB. These findings ought to be interpreted as a U-shaped curve and people in middle age experience the lowest life satisfaction levels. Regarding the gender differences, literature is divided and different studies provide differing outcomes (Dolan et al., 2008). According to several studies such as Helliwell and Putnam (2004) and Bjornskov (2006), happiness and life satisfaction are positively affected by social trust to a considerable extent.

2.3 Reference-driven Happiness Dynamics

Previously we mentioned the Easterlin paradox, as well as the importance of relativity of happiness to others and to ourselves from the past. Kahneman and Tversky (2013) propose: "the value function is defined on deviations from the reference point; generally concave for gains and commonly convex for losses". Which can be adopted to studying happiness as well.

The topic of relative income or reference groups has been rigorously addressed by a bulk of previous studies. These studies concluded that the relative income, defined in a range of different ways and with differently determined reference groups, has a considerable impact on well-being ((Dorn, Fischer, Kirchgässner, and Sousa-Poza, 2007), (Luttmer,

2005), (Clark et al., 2008), (Blanchflower and Oswald, 2004), (Ferrer-i Carbonell, 2005), (McBride, 2001)). The dominance of relative income on actual income in terms of influence on happiness implies that the perception of well-being is highly likely to be manipulated by reference points and the post-recession temporary upswing in happiness is such phenomenon that we aspire to research.

For instance, using ordered probit model with individual random effects on a micro-panel data, Ferrer-i Carbonell (2005) provides an empirical analysis of the importance of "comparison income" for individual well-being or happiness and their findings suggest that increases in family income accompanied by identical increases in the income of the reference group do not lead to significant changes in well-being and the larger an individual's own income is in comparison with the income of the reference group, the happier the individual is.

On individual happiness, McBride (2001) tests the effect of an individual's own income, past financial situation, and cohort (reference) income on Subjective Well-Being. According to the results of this study, there is a negative correlation between Subjective Well-Being and the average income of the individual's reference group and the financial situation of the parents. The latter finding is more important in the context of our study, because it implies that happiness levels are affected by the perception of past experiences.

Caporale, Georgellis, Tsitsianis, and Yin (2009) find that past unemployment has a positive effect on life satisfaction, with such an effect being stronger for unemployment experienced more recently (in the last twelve months) as opposed to unemployment in the more distant past. This finding indicates the presence of a reference value effect and suggests that this effect is temporary in nature. In addition, this paper also highlights that the reference income has a negative and significant effect on life satisfaction.

A more interesting set of results can be found in Graham and Picon (2010), which explores the relation between crisis-related factors and happiness on a daily basis. According to them, the influence of change in market signals on happiness is asymmetric. On a downward cycle, the average daily happiness level follows the market trend. Conversely, happiness level leads the market trend in the recovery period, suggesting the upward trend in well-being is explained by optimism as well as improving economic conditions. They also find out the overall happiness level increased monotonically and eventually surpassing the levels that they were in throughout the pre-crisis period of early 2008, despite the fact that the overall wealth was not fully recovered to the pre-crisis period. These findings may suggest the existence of changing reference point effects.

Verhofstadt, Bleys, and Van Ootegem (2015) investigate how different frames of reference influence the self-reported happiness ratings and find out that self-determined reference points (the happiest period of one's own life or one's perception of the population's average happiness level) affect the reported well-being levels. According to Deaton (2012), general population had more than recovered in the spring of 2009 despite the rising rate of unemployment and lower value of stock market compared to the value before the crash. It also states that the other factors are insufficient to explain this rise in well-being.

Guardiola and Guillen-Royo (2015) finds that during the crisis time in Spain it was rather unemployment and higher education status that were more important determinants of the Subjective Well-Being than income. Moreover, the fact that everyone was experiencing the same shock was not helpful in mitigating the decrease in well-being.

The most important research that we were inspired by and used to develop our models was conducted by Gonza and Burger (2017), using European Social Survey. Though it was not among the paper's primary goals, the outcomes of the Blinder–Oaxaca decomposition and regression analysis, which they employed, suggest that partial explanation to the identified trends can be based on the role of shifting reference frames. Another study regarding the dynamics of happiness by Veenhoven (1991) explores the truthfulness of the following statements:

- People tend to be unhappy under adverse conditions such as poverty, war and isolation,
- Improvement or deterioration of at least some conditions does effect happiness lastingly,
- Earlier hardship does not favor later happiness,
- People are typically positive about their life rather than neutral.

In this paper, we will be particularly focused on the third point. Veenhoven (1991) looks at long term consequences of hard youth/puberty experiences (kids who grew up during great depression/holocaust) and states that there were only moderate signs that the aforementioned proposition is true. However, he focuses on long-term life comparisons rather than short-term, year-to-year fluctuations in happiness. He considers children, as they are particularly vulnerable, and their entire lives can be significantly affected by negative experiences. Finally he looks at extreme cases of misfortunes and adversities such as holocaust or the great depression - situations that are more likely to have lasting adverse effects on a person's mentality. We will concentrate on more moderate examples of hardship - economic downturns.

One noteworthy point to mention is the difference between our hypothesis and hedonic adaptation. Hedonic adaptation refers to the psychological phenomenon where individuals return to a relatively stable baseline - set point - level of happiness despite major positive or negative life changes or events. It means that decreased happiness levels should recover in the post-recession period to their long-term mean. As Lucas (2007) writes the specific set-point varies among individuals, but he also mentions two important facts. First, he shows that in case of important life events like: Marriage, Divorce, Widowhood it takes around 3 or 4 years for an individual to converge to their set-point. Second, he shows that in certain cases like Unemployment, Disability or Severe Disability, individual's SWB is permanently and irreversibly negatively affected. The time it takes for an individual to adapt is unknown, and most likely dependent on the specific event. However, what we propose is the existence of a short-term upwsing effect following a recession derived by reference changes. We suppose our effect is a short term effect that should exist independently from the hedonic adaptation. These two do not conflict; however, existence of hedonic adaptation may affect our results in different ways, which will be discussed in the following parts of the paper.

2.4 Hypothesis

Our hypothesis proposes that in a post-recession state, the observed individual happiness levels will be higher than of what would normally be expected based on typical personal and socioeconomic factors, which would be derived from a shift in the individual's reference point over time, leading them to appreciate the stability they now have more deeply, comparing it to the recent economic downturn. Figure 1 visualizes the proposed hypothesis. This effect is challenging to identify because the set of factors determining well-being levels is quite broad and therefore, it is possible to omit some necessary explanatory variables, even though we provide a good set of control variables. Additionally, the theory is universal, though dynamics may vary in country level. That is the reason why we employ two different datasets for two specifications: European Social Survey and German Socio-Economic Panel datasets. The former will provide us a large pooled cross-sectional data from different countries for a long span of time, which will enable us to study the aforementioned effect for countries of different social and economic development levels. When it comes to the latter one, German SOEP, it is a well-designed and thorough panel data which will let us control for time-invariant individual characteristics that affect happiness, which was not applicable in the ESS.

Following a recession, individuals may recalibrate their reference points downward due to the adverse conditions experienced during the downturn. As the economy stabilizes

Figure 1: Hypothesis

Note: We suggest the existence of the trend demonstrated in the graph. Happiness levels drop during recession and surge(surpassing the baseline) after recession ends. However, this effect is temporary since reference frames adjust continuously.

and conditions improve, the new baseline makes post-recession circumstances appear more favorable. This relative improvement, rather than absolute gains, drives the observed increase in happiness levels. We call this mechanism a reference driven upswing effect in Subjective Well-Being.

2.5 Contribution

Existing happiness economics literature rarely explores the specific role of economic recessions in resetting reference points and mostly investigates the extent of impact of economic downturns on happiness while it lasts or through which channels the financial hardship transmit its effect to individual well-being [(Graham and Picon, 2010); (Gonza and Burger, 2017)]. By contrast, our study investigates a less explored phenomenon: the post-recession upswing in happiness levels, emphasizing the role of shifting psychological reference points. This is crucial as it provides new insights into the temporary upsurge in happiness during recovery periods, a topic that remains underexplored in the happiness economics literature. By introducing this mechanism, our work could become a reference for future studies that look at happiness changes in specific adverse situations (e.g., natural disasters, health pandemics, loss of family members) and how people's comparative reference frames shift.

Our work also contributes to the literature on reference-point dynamics in Subjective Well-Being (SWB). Much of the prior research has analyzed group-based reference points, such as income comparisons among peers [(Luttmer, 2005); (Blanchflower and Oswald, 2004); (Ferrer-i Carbonell, 2005)]. However, the role of one's past socio-economic state as a reference point during and after crises has been relatively neglected. By focusing on how individuals' happiness adjusts to recent economic hardship, we extend this literature and shed light on the psychological mechanisms of adaptation in the context of collective adversity.

We also study such phenomenon to contribute to the existing literature that is interested in happiness dynamics. Economics has always been particularly interested in utility research and it has been some time since prominent economists started to consider the role of well-being measures on such studies. However, our topic of interest can be considered refreshing and can be developed by other researchers with better tools and funds to establish more complex models and sophisticated theories to study it. The insight that happiness can increase due to shifts in reference point varying in time offers a deeper understanding of how well-being is shaped by psychological as well as economic factors.

One final motivation of our research is to contribute to the design of more effective Social Welfare Policies by providing policymakers with a nuanced understanding of how happiness dynamics evolve over time. By exploring how shifts in reference points and changes in individual and collective well-being interact with economic and psychological variables, our findings could inform policies aimed at enhancing societal welfare, especially during the economic contractions when policymakers have to decide between short- and long-term recovery policies.

3 European social study

3.1 Data

According to Gonza and Burger (2017), the European Social Survey (ESS) is a proper dataset for our studied subject, SWB. ESS is a biennial, academically driven survey that measures the attitudes, beliefs, and behavior patterns of diverse populations in more than thirty European nations. Established in 2001, the ESS aims to provide high-quality data to facilitate cross-national comparisons and monitor long-term attitudinal and behavioral changes. The survey covers a wide range of topics including politics, media use, Subjective Well-Being, and social values (ERIC, 2002-2020).

We use the two most common measures of Subjective Well-Being: **Happiness** and **Life Satisfaction**. These are measured by following survey questions in ESS, respectively:

- *Taking all things together, how happy would you say you are?*
- *All things considered, how satisfied are you with your life as a whole nowadays?*

Both of them are discrete ordinal variables on an 11-point scale from 0 to 10. Happiness, compared with Life Satisfaction, should be more focused on assessing only the current happiness situation of the respondents. Generally, however, both measures should produce similar results by concept, and they are empirically highly correlated with each other (Clark and Senik, 2011).

Our model is based on the data derived from 10 rounds of ESS surveys encompassing observations from 19 European countries between the years 2001-2019. We do not include the years after 2019 due to the complex effects of the COVID-19 pandemic, the Russian invasion of Ukraine, and the following economic abnormalities, that may have not yet ended at the time of writing this paper.

We renamed key variables for clarity, harmonized education levels across survey rounds, and created a new variable for marital status. The following Table 1 lists the individual control variables we chose from ESS database.

As expected, we include the fundamental socio-demographic factors that are likely to be correlated with the SWB such as age, gender, health, marital as well as educational status. Among them, we use age and years of education variables together with their squared versions in order to account for their non-linear effects on happiness levels, which are also incorporated to the specification in Gonza and Burger (2017). The categories of economic activity we incorporated encompass household responsibilities such as housework and childcare, employment in a paid position, and unemployment, which is further

- Age
- Gender
- Education
- Years of education
- Marital status
- Health
- Discriminated by ethnicity
- Feeling safe to walk alone
- Frequency of meeting with people
- Joining social activities
- Having someone close
- Importance of being rich
- Importance of being safe
- Importance of equal rights
- Importance of following rules
- Importance of spoiling oneself
- Importance of loyalty towards friends
- Importance of safe surroundings
- Importance of seeking fun
- Importance of strong government
- Importance of helping others
- Last 7 days: housework or childcare
- Last 7 days: having paid job
- Last 7 days: unemployed (jobseeker)
- Last 7 days: unemployed (non-jobseeker)

Table 1: Individual Control Variables from ESS

subdivided into individuals actively seeking employment (jobseekers) and those not currently engaged in the job search (non-jobseekers).

The rest of the individual-specific variables can be categorized into social settings-related and personality traits or values. The former group consists of 5 variables: racial discrimination experience, feeling safe to walk alone, the regularity of meeting with people, the frequency of participating in social activities and having close people. The latter incorporates the variables which specify the importance of wealth, safety, equality, following rules, entertainment, helping others, loyalty to friends, safe surroundings, seeking fun and strong government to a person. This group of variables plays an important part in our model since they alleviate the problems originated from not being able to have individual-level fixed effects.

Finally, we will be using social-economic variables that were found to be impactful in happiness-related studies from the relevant literature, which is crucial for our goal of distinguishing the effect of macroeconomic trends from the post-recession happiness effect we aim to capture, especially when there are no year fixed effects. Our model incorporates five key social-economic variables, specifically: Nominal per capita GDP adjusted for purchasing power parity, the inflation rate, the Gini coefficient as a measure of income inequality, the unemployment rate, and life expectancy. The data for these variables has been sourced from the World Bank database and Eurostat.

3.2 Methodology

In order to test our hypothesis we created the following specification:

$$U_{ict} = \alpha_1 D_{ct} + \alpha_2 D_{ct} \times T_{ct} + \gamma X_{ict} + \delta S_{ct} + \mu_c \ (+\tau_t) + \xi_c + \xi_t + \epsilon_{ict}$$

Where:
- D_{ct} is a dummy variable equal to 1 if the country c was not in a recession in a given year t
- T_{ct} is a binary variable equal to 1 if the country c was in the recession in the year $t-1$, thus the intersection $D_{ct} \times T_{ct}$ is equal to 1 if the year t is the first year after recession for country c
- X_{ict} is the set of individual control variables
- S_{ct} is the set of social-economic control variables
- μ_c and τ_t are country and year fixed effects, respectively
- ξ_c and ξ_t are the clustered standard error terms on country and year, respectively
- ϵ_{ict} is the residual term

In this model, the recession is defined when the GDP per capita in purchasing power parity (current international $) year-to-year growth rate is lower than or equal to 0.5%. Generally, a recession needs to be detected with various macro indicators together, but such complexity is unnecessary for our study. Simply speaking, it usually requires a negative real GDP growth rate for 2 quarters consecutively. However, since we are studying people's Subjective Well-Being, the nominal change will affect individual perception as well, so we decided to use this indicator. We choose 0.5% annual GDP growth as a relatively strict threshold of economic recession, there are also models with 1% threshold reported in the robustness test.

The coefficient of interest in our specification would then be α_2 which essentially shows the impact of the changing reference points in the post-recession period. Statistically, α_2 is the well-being difference between the first year after a recession and all non-recession years. We anticipate it to be positive, in other words, people feel happier or more satisfied even than the average level in the first year of the economic recovery. As to why we chose the length of one year, instead of more years, as the post-recession period, it is due to our finding that only the first year's well-being level is significantly and robustly different from zero. More details will be illustrated later in this chapter.

Note that neither of our datasets allows us for a typical event study model. Firstly,

our event is not a standard event like an economic recession, instead, we study a relatively vague period after the economic recovery starts and the Subjective Well-Being change. It is unable to specifically detect the time when the event happens. Secondly, due to the complexity of the macro-economy and the characteristics of the datasets, the yearly measured variables, and sometimes limited number of years in between recessions make methods like regression discontinuity design inappropriate. Lastly, we have an uneven distribution of observations along the year.

3.3 Results

Table 2 presents the regression results for 3 models with individual life satisfaction as the explained variable. Model 1 includes standard errors clustered on country-year groups and country fixed effects. Model 2 includes standard error clustered on both country and year respectively and country fixed effects. Model 3 is similar to model 1 but includes both country and year fixed effects. Model 3 should be considered less valid for our study because the year fixed effects are likely to capture the impact of a country being one year after recession. This is particularly relevant as European countries tend to experience recessions simultaneously.

As we explained, the coefficient of **The first year after recession** is the main interest of this study. For model 1 and model 2, we see different cluster methods lead to slightly different standard errors but no change in the confidential level. With the significantly positive value of 0.1977, we can say that people are expected to be more satisfied with life during the first year after recession than the no-recession years' average level. Based on the fact that the vast majority of annual changes in life satisfaction do not exceed 2 points, and most people's life satisfaction scores fall between 5 and 8, a change of approximately 0.2 actually represents a significant variation. As we anticipated, with year fixed effects included in Model 3, the coefficient becomes smaller and less significant, though still significant with a 90% confidential level. It demonstrates that the results are robust regardless of the clustering methods and fixed effects.

In the following Table 3, the explained variable is changed to **Happiness**, and we see the same pattern as the previous models with **Life satisfaction**.

We can see that the coefficient, significance, and robustness are stronger for life satisfaction as the explained variable. We suspect it is due to happiness being more focused on the momentary Subjective Well-Being that can be easily influenced by individual char-

Explained Variable: Life Satisfaction			
	Model 1	**Model 2**	**Model 3**
Recession Variables			
No recession	-0.0922***	-0.0922***	-0.1503***
	(0.0323)	(0.0217)	(0.0357)
The first year after recession	0.1977***	0.1977***	0.1480*
	(0.0435)	(0.0702)	(0.0810)
Socio-economic Control Variables			
GDP per capita	2.544e-07	2.544e-07	-5.615e-06**
	(1.835e-06)	(2.881e-06)	(2.359e-06)
Gini-index	0.0039	0.0039	0.0051
	(0.0102)	(0.0176)	(0.0099)
Inflation	-0.0017	-0.0017	-0.0188*
	(0.0086)	(0.0102)	(0.0113)
Unemployment rate	-0.0442***	-0.0442***	-0.0489***
	(0.0057)	(0.0095)	(0.0058)
Life expectancy	0.0454***	0.0454**	0.0368
	(0.0159)	(0.0226)	(0.0354)
Individual controls:	✓	✓	✓
Country fixed effects:	✓	✓	✓
Year fixed effects:			✓
Country-year clusters:	✓		✓
Country and year clusters:		✓	
Observations:	291828	291828	291828

$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 2: ESS Regressions' Results of the First Year After Recession on Life Satisfaction

Note: The table presents regression results where the dependent variable is life satisfaction, with three models including different levels of controls and adjustments. Standard errors are reported in parentheses below the coefficients, and statistical significance is denoted by stars (*p ¡ 0.1, **p ¡ 0.05, ***p ¡ 0.01).

Explained Variable: Happiness			
	Model 1	**Model 2**	**Model 3**
Recession Variable			
No recession	-0.0575*	-0.0575 *	-0.1135 ***
	(0.0333)	(0.0309)	(0.0577)
The first year after recession	0.0776**	0.0776 **	0.0831
	(0.0321)	(0.0328)	(0.0577)
Socio-economic Control Variables			
Life expectancy	0.0365**	0.0365**	0.0590**
	(0.0143)	(0.0221)	(0.0293)
GDP per capita	-1.076e-06	-1.076e-06	-2.711e-06
	(1.507e-06)	(1.507e-06)	(1.821e-06)
Gini-index	0.0025	0.0025	0.0044
	(0.0086)	(0.0149)	(0.0078)
Inflation	-0.0091	-0.0091	-0.0126
	(0.0062)	(0.0065)	(0.0086)
Unemployment rate	-0.0345***	-0.0345***	-0.0340***
	(0.0055)	(0.0108)	(0.0055)
Individual controls:	✓	✓	✓
Country fixed effects:	✓	✓	✓
Year fixed effects:			✓
Country-year clusters:	✓		✓
Country and year clusters:		✓	
Observations:	291828	291828	291828

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Table 3: ESS Regressions' Results of the First Year After Recession on Happiness

acteristics and everyday life events, whereas life satisfaction prompts the respondent to consider longer and more general SWB, hence there are slight differences in the results.

One point worth mentioning is that we see negative values of α_1, the coefficient of **No recession**, even though not always significant, which contradicts most studies. We will be talking about the reason in more detail in the robustness check. When we increase the threshold of recession definition, the problem is solved, while a higher threshold would possibly make our estimation of α_2, our main interest coefficient upwardly-biased estimated. Thus we decided to use a sticker threshold so that the positive result of our models is more reliable. Moreover, even though α_1 is negative, but α_2 is still much higher in absolute value than α_1, which means people are expected to be happier and more satisfied during the first year after recession than both non-recession years and **all years average level**.

For the socio-economic variables, the main determinant seems to be the unemployment rate and life expectancy, surprisingly inflation rate seems to be insignificant. Including or excluding macroeconomic control variables is a risky approach, as both can often lead to endogeneity issues. After conducting a series of robustness tests, we ultimately decided to include these control variables. The detailed process of the robustness tests will be presented in the next section.

Other individual controls are generally in line with the results of Gonza and Burger (2017). Since this is not the focus of our research, we avoid detailing the findings in the main text to prevent redundancy. Instead, the complete table is provided in the appendix.

During the robustness check, we show that our result for the happiness variable is especially dependent on the unemployment rate, that is after excluding unemployment rate, the 1 year past recession variable stops being significant. Including or excluding all other controls keeps the p value within 0.1-0.01 range. This is because the unemployment rate influences both the explained variable (happiness) and explaining variable (intersection between no recession and 1 year after the recession) whose directions are opposite. Of course, higher unemployment means lower happiness. And second, if the unemployment rate is high then for no recession year it is more likely that the country is after recession then before one. Therefore if we omit the unemployment rate, the original positive coefficient will be less positive, which means less significant.

3.4 Robustness check

The primary concern of our analysis is to determine whether only the happiness level in the first year after recession is significantly different from the average. To address this, we applied the same methodology to calculate the happiness levels for the three years before and after the recession, assessing whether these years show any significant results. Our findings are reported in Figure 2. We observe that, whether using life satisfaction (Figure 2-A) or happiness (Figure 2-C) as the dependent variable, applying the methodology of our main model shows that the first year after recession is the only non-recession year where the result is significantly greater than zero at the at least 95% confidence level. If we look at Figure 2-B and Figure 2-D, where we modified the recession threshold, this result still generally holds, which proves the robustness of such findings.

Figure 2 also helps explain why the coefficient for **no recession** is negative, suggesting that recessions might paradoxically make people happier. If we increase the recession threshold from 0.5% to 1%, the coefficient for **no recession** becomes nearly zero, in Figure 2-B and Figure 2-D. This can be better understood through the two bottom panels in Figure 2.

According to Figure 2-E, we find that in the first year before recession, people already perceive the economy as poor. However, during the recession year itself, economic satisfaction nearly returns to the average level. This suggests that our definition of a recession might be overly strict. Specifically, the year prior to the defined recession may already be the start of the downturn, while the defined recession year may include the recession stagnation period. Due to hedonic adaptation, people's satisfaction might tend to regress toward the mean, which explains a happiness or satisfaction increase during the defined recession years.

If we increase the recession threshold, Figure 2-F shows that economic satisfaction during recession years decreases further. This indicates that a higher threshold captures more of the initial years of downturns, thus the coefficient for **no recession** becomes no longer negative. In summary, since we use annual data, the exact timing of recessions is not precisely captured, making the estimation of the **no recession** coefficient less reliable. However, as this is not the focus of our research, we tolerate the minor estimation bias in the **no recession** coefficient. Instead, our priority is to ensure the credibility of the coefficient for **the first year after recession**, which aligns more closely with our research question.

To verify the impact of the inclusion or exclusion of control variables on the robustness of

Figure 2-A

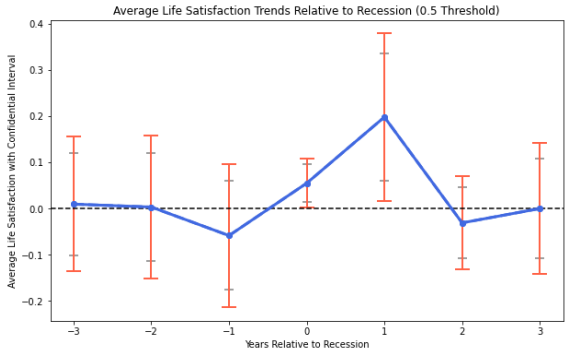

Figure 2-B

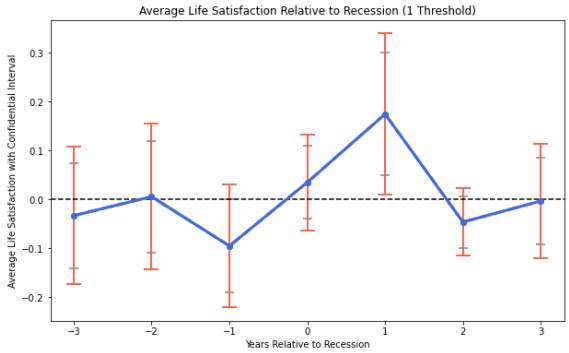

Figure 2-C

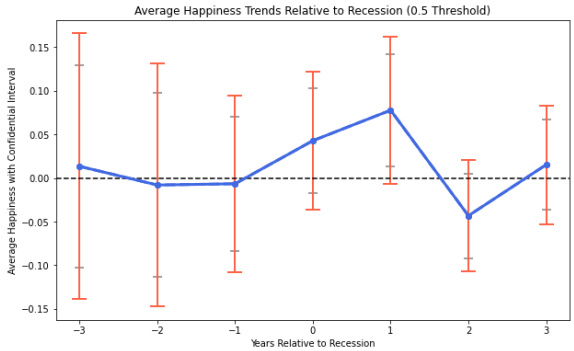

Figure 2-D

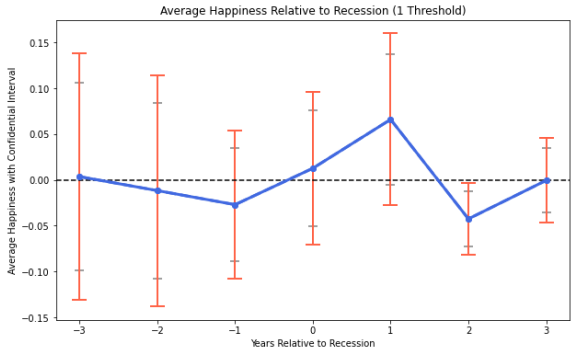

Figure 2-E

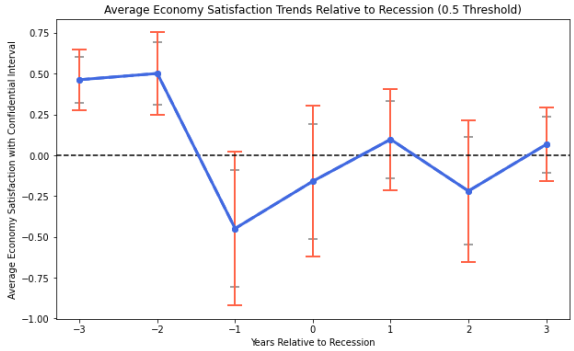

Figure 2-F

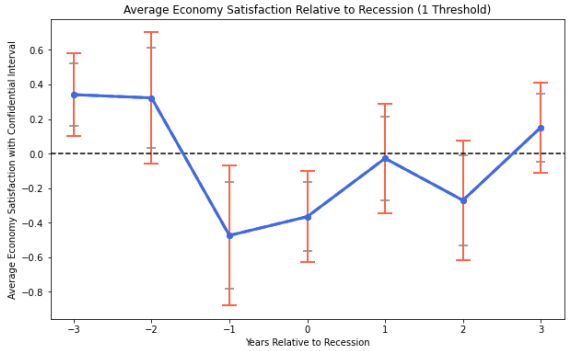

Figure 2: Regression Coefficients with Confidential Intervals

Notes:

a) In these figures, instead of using the first year after recession as the explaining variable, we use the first, second, or third year before or after recession respectively.

b) The two figures on the top, meaning 2-A and 2-B use **Life satisfaction** as explained variable; the two in the middle, 2-C and 2-D use the **Happiness** as explained variable; while the bottom two, 2-E and 2-F use the **Economy satisfaction**.

c) The three on the left choose 0.5% of GDP per capita ppp growth rate (current international $) as the threshold of economic recession; while the three on the right use 1%.

d) The vertical lines in the graphs are the confidential intervals, with the longer horizontal lines on the edge label the 99% confidential intervals and the shorter ones label the 95% confidential intervals.

the regression structure, we tested our main model by removing all or part of the control variables and examined the regression results. The robustness test results for using **Life Satisfaction** and **Happiness** as the dependent variables are presented in Tables 4 and 5, respectively.

From these tables, it can be observed that for Life Satisfaction, the inclusion or exclusion of control variables has minimal impact on the sign and significance of α_2, demonstrating the stability of the model. However, for the Happiness regression, including macroeconomic control variables is crucial for maintaining the significance of the results. This is the primary reason we ultimately decided to include socio-economic controls in the main model. It is worth noting, however, that as more control variables are added, the value of α_1 is incorrectly estimated as negative.

After a more detailed examination, we found out that the unemployment rate is the most decisive control for the model with happiness as the explained variable. We first argue that it is theoretically an important control. The unemployment rate influences both the explained variable (happiness) and the explaining variable (the first year after recession) whose directions are opposite. Obviously, higher unemployment means lower happiness. Moreover, if the unemployment rate is high then for no recession year it is more likely for the country to be after recession than before one. Therefore if we omit the unemployment rate, the original positive coefficient will be downwardly estimated, which means less significant.

In addition, we used the raw data to illustrate the changes in unemployment rates and happiness before and after recessions. As shown in Figure 3, the relationship between these two variables seems to be heavily affected by the recession. Before the recession, the two exhibit a clear negative correlation; while after the recession this relationship completely vanishes, even inverts. Especially during the first year after recession, despite the unemployment rate growth, the happiness level rises. We treat this as a support for our hypothesis, as it aligns with our theoretical explanation in the last paragraph. This point is intriguing but falls beyond the scope of our discussion. However, we can still propose some plausible hypotheses regarding the potential reasons, such as the subjectivity inherent in SWB. Possibly high unemployment becomes something that the population adjusts to and then gets better as at least the general recession is going to an end. It is worth to note here however, that Lucas (2007) showed that unemployment had a permanent negative effect on SWB, which makes our discovery even more relevant.

Explained Variable: Life Satisfaction				
	Model 1	**Model 2**	**Model 3**	**Model 4**
Recession Variables				
No recession	0.0633	0.0356	0.0357	-0.0922***
	(0.0448)	(0.0339)	(0.0387)	(0.0323)
The first year after recession	0.1407**	0.1264***	0.2023***	0.1977***
	(0.0574)	(0.0429)	(0.0456)	(0.0435)
Socio-economic Control Variables				
GDP per capita			2.179e-06	2.544e-07
			(2.664e-06)	(1.835e-06)
Gini-index			0.0090	0.0039
			(0.0121)	(0.0102)
Inflation			-0.0031	-0.0017
			(0.0095)	(0.0086)
Unemployment rate			-0.0613***	-0.0442***
			(0.0069)	(0.0057)
Life expectancy			0.0627***	0.0454***
			(0.0203)	(0.0159)
Individual controls:		✓		✓
Country fixed effects:	✓	✓	✓	✓
Country-year clusters:	✓	✓	✓	✓
Observations:	291828	291828	291828	291828

$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 4: Robustness Tests with Regressions' Results of the First Year After Recession on Life Satisfaction

Explained Variable: Happiness				
	Model 1	**Model 2**	**Model 3**	**Model 4**
Recession Variable				
No recession	0.0564	0.0356	-0.0256	-0.0575*
	(0.0383)	(0.0339)	(0.0365)	(0.0333)
The first year after recession	0.0466	0.0354	0.0928***	0.0776**
	(0.0376)	(0.0281)	(0.0337)	(0.0321)
Socio-economic Control Variables				
Life expectancy			0.0556***	0.0365**
			(0.0165)	(0.0143)
GDP per capita			-2.719e-07	-1.076e-06
			(1.997e-06)	(1.507e-06)
Gini-index			0.0073	0.0025
			(0.0104)	(0.0086)
Inflation			-0.0093	-0.0091
			(0.0076)	(0.0062)
Unemployment rate			-0.0462***	-0.0345***
			(0.0070)	(0.0055)
Individual controls:		✓		✓
Country fixed effects:	✓	✓	✓	✓
Country-year clusters:	✓	✓	✓	✓
Observations:	291828	291828	291828	291828

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Table 5: Robustness Tests with Regressions' Results of the First Year After Recession on Happiness

Figure 3: Happiness and Unemployment Relationship,ESS

Note: Average happiness and Unemployment rate seem to follow the opposite trends; however, this relation inverts after the recession and follow similar patterns. It aligns with our theoretical approach.

4 Micro-economic panel

4.1 Data

The ESS data used in the previous chapter is suitable for our research because it covers multiple periods of economic recession across various European countries, providing strong support for the external robustness of our study. However, as we have found, with the addition of individual and socio-economic control variables, the regression coefficient estimate for the "no recession" term in our model becomes biased. Even though we analyzed the possible reasons for this bias in the theoretical way and robustness checks and showed that its impact on our research conclusions is minimal, it would still be valuable to narrow the scope and specifically study fixed subjects from one country. Using an individual fixed-effects model for estimation could provide more reliable and micro-level insights for our research.

We decided to run a similar specification using German Socio-Economic Panel(SOEP), a wide-ranging representative longitudinal study of private households in Germany, based at the German Institute for Economic Research, DIW Berlin. Due to the differences between the ESS and the SOEP survey structures and questions, it is not possible to run the exact same specifications for both of them; however, they remain largely similar in many respects.

Every year since 1984, individuals in the questionnaire households have been surveyed by the SOEP's fieldwork organization, which means that the dataset covers a little less than 40 years. Yet, we employ only a portion of this period for several reasons. First of all, the data, especially in the initial questionnaire waves, exclude quite many variables which are essential parts of our model. Since the number of missing variables is quite high in these years, the methods such as imputation of missing values are not optional. Secondly, the historical developments such as the unification of Western and Eastern Germany and the outbreak of the COVID-19 pandemic were major impediments to our study. The initial years of SOEP data collection only took place in Western Germany and only in 1991 it started to also incorporate Eastern Germany as well. Even in the following period, the factors such as adaptation of both sides to the new system, cultural as well as social differences derived from capitalist and communist regimes, the fading effects of the Cold War, economic divergence based on two groups cause some troubles in the model. When it comes to the impact of COVID, the lockdown or the increasing number of deaths or concern for survival; all these factors make it really difficult to study the effect we aim to study without significant levels of bias. Consequently, the timeframe incorporated in our model spans from 2001 to 2019, the same as the ESS model.

As we mentioned before, our second model uses self-reported life satisfaction level as dependent variable due to the absence of self-reported happiness variable in the dataset. In a similar fashion to the ESS dataset, this variable is also a discrete ordinal variable on an 11-point scale from 0 to 10.

We use a similar set of control variables in this regression, including health, age, sex, years of education as well as level of education. Similarly, we add the squared age and years of education variables. The rest of the individual-specific variables are excluded in the model solely due to their absence in the SOEP database; be it completely nonexistent or limited to a very short period of time. However, this is not a major concern because the majority of the missing variables are inherent characteristic traits that are considered to be time-invariant to a great extent, such as importance of entertainment or loyalty. We are mostly able to control for these happiness determinants through the use of Fixed-Effects model - an option given by the panel structure of data. Hence, our models are comparable to a reasonable extent.

One important point that we need to mention about data cleaning process is the excess number of observations that we got rid of. We saw an unusually high number of observations in 2010. We therefore removed these observations that appeared only in 1 or 2 of the following years: 2009, 2010, 2011. Figure 4 illustrates its result. The number of short-lived observations is relatively higher around the 2008 economic recession period,

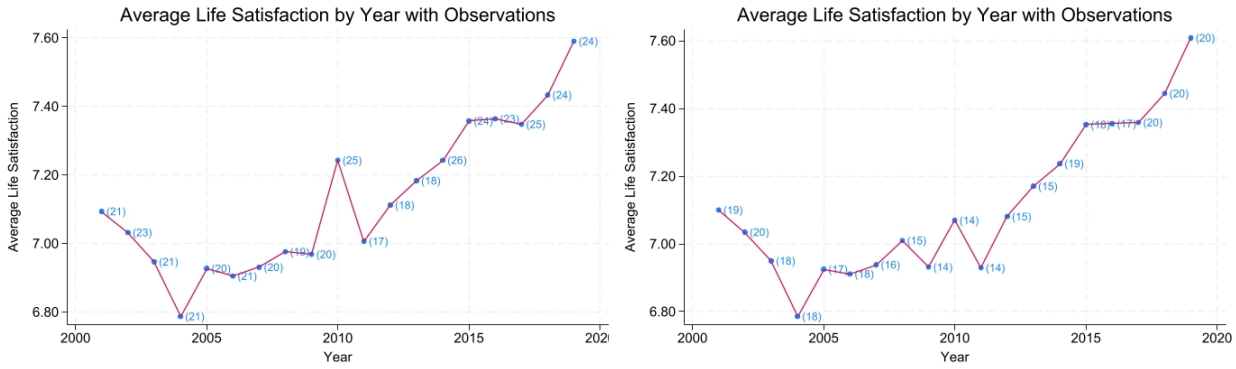

Figure 4: Before(left) and After(right) Removing Extra Observations

Note: The values in the brackets are the amount of observations in thousands in each specific year.

which could be derived from the monetary incentives of participating in the surveys. In both graphs, we observe similar trends, with only dropping levels of life satisfaction being different in the recession year. More importantly, both graphs reveal a noticeable spike in life satisfaction levels between 2009 and 2010, followed by a sharp decline in 2011. This pattern provides intuitive support for our hypothesis, suggesting that varying reference points during this period may have influenced reported life satisfaction.

We include several new individual-level variables. Firstly, the model includes citizenship variable because it measures the effect of social isolation abroad or increasing life standards for people migrating from poorer countries. Another new variable is "handicapped", which controls for the effect of physical limitation on happiness. Unlike the previous dataset, the SOEP dataset provides a monthly income variable, which allows for a more nuanced analysis of economic factors in our model. By including monthly income as a control variable, we can better account for individual income variations that may influence our dependent variables. Finally, we also control for crime concerns of people. The rest of the variables in the model are socio-economic variables and they are exactly the same ones as the ESS model. The full list of the individual controls is as follows in Table 6.

4.2 Methodology

Similar to the previous model, the years which had GDP ppp per capita growth rates lower than 0.5 were determined as economic recession period. We used the recession periods to identify the post-recession years and construct the variable **the first year after recession** in the same way as ESS model. The fixed-effects model's specification is as follows.

• Health	• Total income
• Unemployed	• Concerns about crime trends in Germany
• Working status	• Last 7 days: having paid job
• Handicapped	• Citizenship
• Health	• Education with respect to high school
• Age	• Number of years of education
• Age^2	• Number of years of education^2
• Marital status	

Table 6: Individual Control Variables from ESS

$$U_{it} = \alpha_1 D_t + \alpha_2 D_t \times T_t + \gamma X_{it} + \delta S_t + \mu_i \ + \xi_i + \epsilon_{it}$$

Where:
- D_t is a dummy variable equal to 1 if Germany was not in a recession in a given year t
- T_t is a binary variable equal to 1 if Germany was in the recession in the year $t-1$, thus the intersection $D_t \times T_t$ is equal to 1 if the year t is the first year after recession for Germany
- X_{it} is the set of individual control variables
- S_t is the set of social-economic control variables
- μ_i are individual fixed effects
- ξ_i is the clustered standard error term on individuals
- ϵ_{it} is the residual term

Similar to the ESS model, we use the interaction term to capture the upswing effect in happiness in the post-recession period and our coefficient of interest is α_2. Due to the previously introduced reasons, we have individual fixed effects, but no year fixed effects. We also have clustered standard error on individuals, which is appropriate for the structure of SOEP dataset.

4.3 Results

Table 7 provides the estimation results for our fixed-effects regressions. In Model 1 we start with no controls, and add individual controls in Model 2, socio-economic controls in Model 3, and finally include all controls in Model 4. Overall, the results derived from the SOEP data are consistent with those obtained from the ESS data, often yielding even more robust insights. It is suggested that in the first year after recessions, self-reported life satisfaction levels are around 0.18 points (on a scale from 0 to 10) higher than the average level of all non-recession years. Compared with the ESS model, the coefficients

are almost the same in value, which shows the stability and robustness of our study.

As more control variables are added, we find that α_2 remains positive and becomes increasingly significant. In Model 2, after including individual controls, the coefficient is nearly significant. When socio-economic variables are added, the coefficient becomes significant at the 99% confidence level. With all control variables included, the absolute value of the coefficient increases, and its significance level becomes even higher.

Explaned Variable: Life Satisfaction				
	Model 1	**Model 2**	**Model 3**	**Model 4**
Recession Variables				
No recession	0.1312***	0.1170***	0.0819***	0.0392***
	(0.0108)	(0.0104)	(0.0143)	(0.0141)
The first year after recession	0.0067	0.0233	0.0958***	0.1785***
	(0.0108)	(0.0104)	(0.0124)	(0.0128)
Socio-economic Control Variables				
Unemployment rate			-0.0669***	-0.0726***
			(0.0031)	(0.0030)
Gini-index			0.0713***	0.1525***
			(0.0072)	(0.0083)
Inflation			-0.0329***	-0.0833***
			(0.0046)	(0.0051)
Life expectancy			-0.2048***	-0.0595***
			(0.0092)	(0.0104)
GDP per capita			-4.00e-6***	3.74e-5***
			(1.45e-6)	(2.93e-6)
Individual controls:		✓		✓
Individual fixed effects:	✓	✓	✓	✓
Individual clusters:	✓	✓	✓	✓
Observations:	325821	325821	325821	325821

Standard errors in parentheses

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

Table 7: SOEP Regressions' Results of the First Year After Recession on Life Satisfaction

Regarding socio-economic controls, unlike in the ESS model, their regression coefficients are all highly significant in this case. This might be because our scope is narrowed down to Germany, only one single country. Because of the same reason, the parameter estimates for incorporating multiple time series variables are often unreliable, which might explain the negative coefficient of life expectancy. However, this does not affect the estimation of the core variables and thus requires no special concern.

It is particularly noteworthy that the regression coefficient for "no recession" in the SOEP model is significantly positive and remains so regardless of the addition or removal of control variables. This provides an important supplement to our ESS model, enhancing the internal validity of our conclusions. It is important to mention that our model does not consider 2002 and 2003 as recession years since they do not fall into the definition of recession in our model. However, we did further test by recognizing them as recession years and our coefficient of interest became insignificant. Yet again, changing the end of recession to 2004, on the other hand, would strengthen our hypothesis and it is not surprising since the end of the recession is badly defined for this period.

4.4 Robustness Check

The robustness checks performed in this section aim to validate the reliability and consistency of the main findings by examining their sensitivity to alternative specifications and assumptions. In the first stage, we run various model specifications, excluding certain variables to assess the stability of the results under different assumptions. The results show a very limited variation to these specifications. Furthermore, as it is observed in Figure 5, life satisfaction levels and unemployment rates follow the opposite trends during the given period. Notable exception is the 2010-2011 period when a large drop is observed in life satisfaction levels despite the decreasing unemployment rate. This trend supports our theory since such a steep decrease can be explained by the attenuating effect of post-recession bounce back in the SWB levels, considering the fact that the changes in other variables in the model are unlikely to explain it.

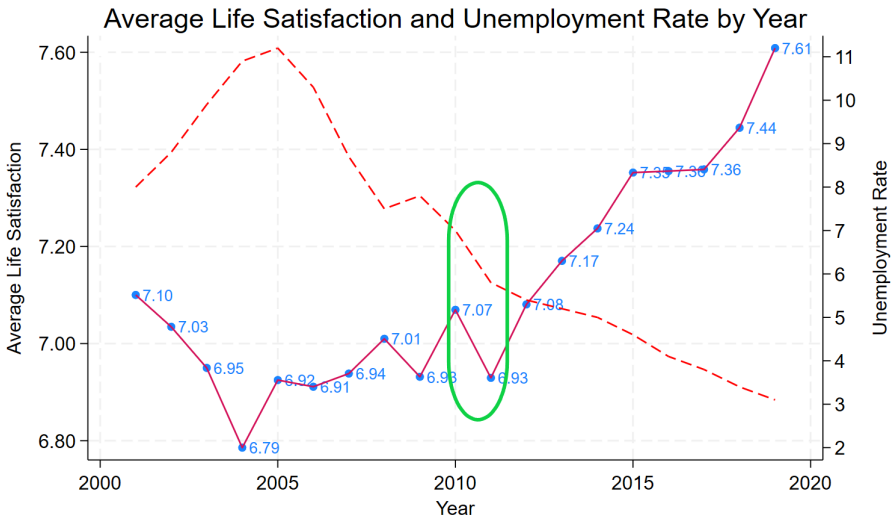

Figure 5: Happiness and Unemployment Relationship, SOEP

Note: Average Life Satisfaction and Unemployment rate follow opposite trend. Notable exception is 2010-2011, which is likely to be an outcome of the upswing effect, since this effect is fleeting and it should return to the set point.

In the second stage, we used another definition of economic crises through using unemployment rate, which suggests that years that experienced an increase in unemployment rate are defined as economic recession periods. See 9. Under this assumption, the effect diminished; however, it is still positive and significant. One interesting finding was that, the non-recession years were characterized by lower levels of life satisfaction, similar to our results in the model using the ESS data. In a similar fashion, this effect is very small and statistically insignificant. We also compare the results of our findings with the ones from Gonza and Burger (2017) and except few variables, most of the outcomes are compatible.

Finally, we test that the mean life satisfaction in the first post-recession year is higher and statistical different than the mean of 3 years before recession. Our model deliver the results which compares the post-recession year from all the economic stability years included in the dataset. Figure 5 shows that an upward trend in average happiness levels persists throughout the given period. Therefore, we use this test to determine whether this post-recession happiness level upswing is not a part of a relatively long-lasting trend. Moreover, this test uses raw data and do not have the drawbacks of largely specified model which may lead to estimation bias. Table 8 summarizes the results of a two-sample t-test with equal variances, comparing the means of Group 1 and Group 2, the samples from first post-recession year and 3 year before the recession, respectively. Group 1 has a higher mean (7.070) compared to Group 2 (6.950), with a statistically significant mean difference of 0.119. The t-statistic is 7.003 with 62,215 degrees of freedom, indicating a highly significant result. These results provide strong evidence to reject the null hypothesis, confirming that the two group means are not equal.

Group	**Observations**	**Mean**	**Std. Error**	**95% Confidence Interval**
1	13,672	7.0696	0.0147	[7.0406,7.0985]
2	48,545	6.9504	0.0080	[6.9347,6.9661]
Combined	62,217	6.9766	0.0070	[6.9627,6.9904]
Difference in Means		0.1192	0.0170	[0.0858, 0.1525]
t-Statistic (Degree of Freedom)			7.0035(62,215)	
Hypothesis Testing				
Null Hypothesis	(H_0): diff = 0			
Alternative Hypotheses	diff < 0: Pr(T<t) = 1.0000		diff > 0: Pr(T>t) = 0.0000	

Table 8: Mean test of the first year after recession and 3 years before recession

5 Discussion and Conclusion

5.1 Discussion

In general, our empirical study delivers reliable and robust results. One potential alternative to our chosen method would be an event study which was inapplicable for the datasets we used. This research could be further enhanced by utilizing a dataset that measures well-being levels at higher frequencies, such as quarterly, monthly, or weekly intervals, since SWB measures show substantial amounts of variations in such frequencies. It is probable that our hypothesis performs better in such intervals and maybe, annual frequency is not sufficient to capture the full effect in detail. Obviously, observations in such frequencies are prone to distortions of daily life; however, when they are efficiently controlled for, more reliable estimations can be obtained.

While this paper focuses on measuring the impact of changing reference points, it is unable to fully take another ongoing process into consideration, which is known as "hedonic adaption". Hedonic adaptation refers to the mean reversion of happiness levels in the long-term: rather than having permanent effects, events, be it positive or negative, mostly cause shocks in well-being measures and eventually, these shocks fade away. The magnitude and longevity of this process heavily vary with characteristics of the specific events, timing or personal traits. Depending on the duration, hedonic adaptation is likely to distort our results in opposite directions. Since the length of hedonic adaptation after economic recession is uncertain, it is possible that it takes a longer time for people to return to their set point, our estimation of reference-driven upswing effect may be biased downward.

The threshold used to define recessions may not capture the full complexity of economic recessions, particularly for countries experiencing milder or delayed effects. We tested different thresholds and also used unemployment rate definition as robustness check to see the extent of our results' reliability. However, the lack of a standardized recession definition is still a concern in the context of our work. Future research could incorporate alternative recession indicators, such as unemployment spikes or household income declines.

For future studies we believe it would be interesting to dive deeper in the relationship between unemployment and SWB. We showed a unique twist in the correlation of these two which deserves its own study. Perhaps other macro-variables not considered in our model (interest rates, social spending) could present similar behavior. Alternatively, the upswing effect is worth investigating in everyday negative shocks, like watching sad movies

or being temporary stuck in traffic.

5.2 Conclusion

This thesis explored the reference-driven upswing effect in SWB levels during post-recession periods by examining shifts in reference points and their role in shaping Subjective Well-Being. Using data from the European Social Survey and the German Socio-Economic Panel, the analysis revealed a significant rise in happiness levels after economic recession. The initial model delivers results that the average Subjective Well-Being levels increase and surpass the pre-recession level. This upward trend is fleeting, occurs before the full economic recovery, encompasses several countries and is explained by neither individual nor macroeconomic variables. The second model only incorporates individual panel data from Germany, uses a variation of the same model and delivers similar set of results not just for the coefficient of interest but also for the majority of the controls. The results from both models are economically and statistically significant. Moreover, the outcomes are stable to a large extent under different assumption or to differing specifications, which shows the findings are robust.

The results underscore the importance of psychological reference points, showing that happiness is influenced not solely by absolute economic conditions but also by individuals' relative perceptions of improvement. It also highlights the complex interplay between psychological factors and economic indicators.

The findings of this research offer valuable insights that may contribute to a broader understanding of the topic. While further studies are needed to confirm and expand upon these results, they provide a foundation for future exploration and potential applications. By demonstrating that Subjective Well-Being is significantly influenced by dynamic reference points, this study highlights the potential for interventions targeting psychological and perceptual factors to complement economic recovery efforts. Policymakers can leverage these insights to design strategies that mitigate the negative psychological impacts of negative shocks while fostering a sense of optimism during recovery periods.

In conclusion, this thesis advances our understanding of happiness dynamics in post-recession contexts, emphasizing the importance of both psychological and economic determinants. While further research is necessary to refine these findings and explore their broader applicability, this work provides a foundation for future investigations into the interplay of reference points, economic conditions, and well-being.

References

Lara B Aknin, Michael I Norton, and Elizabeth W Dunn. From wealth to well-being? money matters, but less than people think. *The Journal of Positive Psychology*, 4(6):523–527, 2009.

Lalin Anik, Lara B Aknin, Michael I Norton, and Elizabeth W Dunn. Feeling good about giving: The benefits (and costs) of self-interested charitable behavior. *Harvard Business School Marketing Unit Working Paper*, (10-012), 2009.

Dimitris Ballas and Ilias Thanis. Exploring the geography of subjective happiness in europe during the years of the economic crisis: A multilevel modelling approach. *Social Indicators Research*, 164(1): 105–137, 2022.

Martin Binder. Subjective well-being capabilities: Bridging the gap between the capability approach and subjective well-being research. *Journal of Happiness Studies*, 15(5):1197–1217, 2014.

Christian Bjornskov. The multiple facets of social capital. *European Journal of Political Economy*, 22 (1):22–40, 2006.

David G. Blanchflower and Andrew J. Oswald. Well-being over time in britain and the usa. *Journal of Public Economics*, 88(7):1359–1386, 2004. ISSN 0047-2727.

Guglielmo Maria Caporale, Yannis Georgellis, Nicholas Tsitsianis, and Ya Ping Yin. Income and happiness across europe: Do reference values matter? *Journal of Economic Psychology*, 30(1):42–51, 2009.

Andrew E. Clark and Claudia Senik. Is happiness different from flourishing? cross-country evidence from the ess. *Revue d'économie politique*, 121(1):17–34, 2011.

Andrew E Clark, Paul Frijters, and Michael A Shields. Relative income, happiness, and utility: An explanation for the Easterlin Paradox and other puzzles. *Journal of Economic Literature*, 46(1): 95–144, 2008.

Angus Deaton. The financial crisis and the well-being of Americans: 2011 OEP Hicks Lecture. *Oxford Economic Papers*, 64(1):1–26, 2012.

Kristina M DeNeve and Harris Cooper. The happy personality: a meta-analysis of 137 personality traits and subjective well-being. *Psychological Bulletin*, 124(2):197, 1998.

Ed Diener and Micaela Y Chan. Happy people live longer: Subjective well-being contributes to health and longevity. *Applied Psychology: Health and Well-Being*, 3(1):1–43, 2011.

Ed Diener, Martin EP Seligman, Hyewon Choi, and Shigehiro Oishi. Happiest people revisited. *Perspectives on Psychological Science*, 13(2):176–184, 2018.

Paul Dolan, Tessa Peasgood, and Mathew White. 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(1):94–122, 2008.

David Dorn, Justina A. Fischer, Gebhard Kirchgässner, and Alfonso Sousa-Poza. Is it culture or democracy? the impact of democracy and culture on happiness. *Social Indicators Research*, 82(3):505–526, 2007.

Richard A Easterlin. Does economic growth improve the human lot? some empirical evidence. In *Nations and Households in Economic Growth*, pages 89–125. Elsevier, 1974.

ESS ERIC. European social survey european research infrastructure. *ESS Rounds 1-10 Data, NSD - Norwegian Centre for Research Data, Norway – Data Archive and distributor*, Data file editions 6.6, 3.7, 3.7, 4.5, 3.3, 2.3, 2.2, 2.2, 3.1, 3.1., 2002-2020.

Ada Ferrer-i Carbonell. Income and well-being: an empirical analysis of the comparison income effect. *Journal of Public Economics*, 89(5):997–1019, 2005. ISSN 0047-2727.

Gregor Gonza and Anže Burger. Subjective well-being during the 2008 economic crisis: Identification of

mediating and moderating factors. *Journal of Happiness Studies*, 18:1763–1797, 2017.

Soumya Chattopadhyay Graham, Carol and Mario Picon. Adapting to adversity: Happiness and the 2009 economic crisis in the united states. *Social Research*, 77:715–748, 2010.

Jorge Guardiola and Monica Guillen-Royo. Income, unemployment, higher education and wellbeing in times of economic crisis: Evidence from granada (spain). *Social Indicators Research*, 120:395–409, 2015.

Dora Gudrun Gudmundsdottir. The impact of economic crisis on happiness. *Social Indicators Research*, 110(3):1083–1101, 2013.

John Helliwell and Robert Putnam. The social context of well-being. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*, 359:1435–46, 2004.

John F Helliwell, Richard Layard, Jeffrey Sachs, and Jan Emmanuel De Neve. World happiness report 2020. *World Happiness Report 2020*, 2020.

Putnam RD Helliwell JF. The social context of well-being. *Philosophical Transactions of the Royal Society of London Series Biological Sciences,*, 359(1449):1435–1446, 2004.

Daniel Kahneman and Alan B. Krueger. Developments in the measurement of subjective well-being. *The Journal of Economic Perspectives*, 20:3–24, 2006.

Daniel Kahneman and Amos Tversky. Prospect theory: An analysis of decision under risk. In *Handbook of the fundamentals of financial decision making: Part I*, pages 99–127. World Scientific, 2013.

Schkade David A. Krueger, Alan B. The reliability of subjective well-being measures. *Journal of Public Economics*, 92(8):1833–1845, 2008.

Aleksander Kucel and Montserrat Vilalta-Bufí. Job Satisfaction Of University Graduates. *Revista de Economia Aplicada*, 21(1):29–55, 2013.

Orsolya Lelkes. Knowing what is good for you: Empirical analysis of personal preferences and the "Objective Good". *Journal of Behavioral and Experimental Economics (formerly The Journal of Socio-Economics)*, 35(2):285–307, April 2006.

Ambrose Leung, Cheryl Kier, Tak Fung, Linda Fung, and Robert Sproule. Searching for happiness: The importance of social capital. *Journal of Happiness Studies*, 12(3):443–462, 2011.

Richard E Lucas. Adaptation and the set-point model of subjective well-being: Does happiness change after major life events? *Current Directions in Psychological Science*, 16(2):75–79, 2007.

Erzo F.P. Luttmer. Neighbors as negatives: Relative earnings and well-being. *The Quarterly Journal of Economics*, 120(3):963–1002, 2005.

George MacKerron and Susana Mourato. Happiness is greater in natural environments. *Global Environmental Change*, 23(5):992–1000, 2013.

Michael McBride. Relative-income effects on subjective well-being in the cross-section. *Journal of Economic Behavior & Organization*, 45(3):251–278, 2001. ISSN 0167-2681.

David G Myers. The funds, friends, and faith of happy people. *American Psychologist*, 55(1):56, 2000.

Kelsey J. O'Connor. Who suffered most from the great recession? happiness in the united states. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 3(3):72–99, 2017. ISSN 23778253, 23778261.

OECD. Oecd guidelines on measuring subjective well-being. *OECD publications*, page 270, 2013.

Fumio Ohtake. Unemployment and happiness. *Japan Labor Review*, 9(2):59–74, 2012.

Ayse Begum Otken and Gül Selin Erben. The relationship between work-life balance and happiness from the perspectives of generation x and y. *Humanities and Social Sciences Review*, 2(4):45–53, 2013.

Amado Peiro. Happiness, satisfaction and socio-economic conditions: Some international evidence. *The Journal of Socio-Economics*, 35:348–365, 2006.

Christopher Peterson, Willibald Ruch, Ursula Beermann, Nansook Park, and Martin EP Seligman. Strengths of character, orientations to happiness, and life satisfaction. *The Journal of Positive Psychology*, 2(3):149–156, 2007.

Piers Steel, Joseph Schmidt, and Jonas Shultz. Refining the relationship between personality and subjective well-being. *Psychological Bulletin*, 134(1):138, 2008.

Stutzer. The role of income aspirations in individual happiness. *Journal of Economic Behavior Organization*, 54:89–109, 2004.

Stutzer and Frey. Stress that doesn't pay: The commuting paradox. *The Scandinavian Journal of Economics*, 110:339–366, 2008.

Rafael D. Tella and Robert MacCulloch. Some uses of happiness data in economics. *The Journal of Economic Perspectives*, 20(1):25–46, 2006.

Ruut Veenhoven. Is happiness relative? *Social Indicators Research*, 24:1–34, 1991.

Elsy Verhofstadt, Brent Bleys, and Luc Van Ootegem. Reference-dependency of happiness ratings. *Journal of Happiness Studies*, 16(6):1437–1454, 2015.

Mathew P White, Ian Alcock, Benedict W Wheeler, and Michael H Depledge. Would you be happier living in a greener urban area? a fixed-effects analysis of panel data. *Psychological Science*, 24(6): 920–928, 2013.

Rainer Winkelmann. Unemployment and happiness. *IZA World of Labor*, 2014.

A Table Appendix

Explaned Variable: Life Satisfaction				
	Model 1	**Model 2**	**Model 3**	**Model 4**
Recession Variables				
The first year after recession	-0.0263***	-0.0169**	0.1099***	0.1150***
	(0.0084)	(0.0080)	(0.0105)	(0.0102)
No recession	-0.0585***	-0.0442***	-0.0318**	-0.0348***
	(0.0083)	(0.0085)	(0.0131)	(0.0126)
Socio-economic Control Variables				
Unemployment rate			-0.0764***	-0.0806***
			(0.0034)	(0.0033)
Gini			0.0689***	0.1239***
			(0.0071)	(0.0079)
Inflation			-0.0132***	-0.0584***
			(0.0046)	(0.0053)
Life expectancy			-0.2170***	-0.0801***
			(0.0097)	(0.0113)
GDP per capita			-0.0000**	0.0000***
			(0.0000)	(0.0000)
Individual controls:		✓		✓
Individual fixed effects:	✓	✓	✓	✓
Individual clusters:	✓	✓	✓	✓
Observations:	325821	325821	325821	325821

Standard errors in parentheses

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

Table 9: SOEP Regressions' Results of the First Year After Recession on Life Satisfaction using Unemployment rate as recession definition

Explained Var: Happiness	**Model 1**	**Model 2**	**Model 3**
Recession Variables			
No recession	$-0.058^{*}(0.033)$	$-0.058^{*}(0.031)$	$-0.113^{**}(0.038)$
The first year after recession	$0.078^{**}(0.032)$	$0.078^{**}(0.033)$	0.083(0.058)
Individual Controls			
Age	$-0.047^{***}(0.002)$	$-0.047^{***}(0.004)$	$-0.047^{***}(0.002)$
Age squared	$0.0005^{***}(0.00002)$	$0.0005^{***}(0.00003)$	$0.0005^{***}(0.00002)$
Discriminated by ethnicity	$-0.432^{***}(0.047)$	$-0.432^{***}(0.030)$	$-0.435^{***}(0.047)$
Education level	0.0001(0.001)	0.0001(0.002)	0.00006(0.001)
Education years	$0.033^{***}(0.005)$	$0.033^{***}(0.012)$	$0.032^{***}(0.005)$
Education years squared	$-0.001^{***}(0.0002)$	$-0.001^{**}(0.0004)$	$-0.001^{***}(0.0002)$
Feeling safe to walk alone	$-0.131^{***}(0.007)$	$-0.131^{***}(0.012)$	$-0.129^{***}(0.007)$
Frequency of meeting people	$0.100^{***}(0.004)$	$0.100^{***}(0.007)$	$0.100^{***}(0.004)$
Gender	$0.063^{***}(0.009)$	$0.063^{***}(0.017)$	$0.063^{***}(0.009)$
Have someone close	$-0.509^{***}(0.021)$	$-0.509^{***}(0.034)$	$-0.505^{***}(0.021)$
Health	$-0.515^{***}(0.009)$	$-0.515^{***}(0.021)$	$-0.515^{***}(0.008)$
Importance to be rich	$0.078^{***}(0.004)$	$0.078^{***}(0.006)$	$0.078^{***}(0.004)$
Importance to be safe	$-0.034^{***}(0.004)$	$-0.034^{***}(0.005)$	$-0.033^{***}(0.003)$
Importance of equal rights	0.0024(0.005)	0.0024(0.009)	0.0014(0.005)
Importance to follow rules	$-0.020^{***}(0.003)$	$-0.020^{**}(0.007)$	$-0.020^{***}(0.003)$
Importance to spoil oneself	$-0.064^{***}(0.005)$	$-0.064^{***}(0.012)$	$-0.064^{***}(0.005)$
Importance to help others	$-0.057^{***}(0.005)$	$-0.057^{***}(0.010)$	$-0.058^{***}(0.005)$
Importance of loyalty to friends	$-0.066^{***}(0.006)$	$-0.066^{***}(0.010)$	$-0.066^{***}(0.006)$
Importance of safe surroundings	$-0.0050(0.004)$	$-0.0050(0.008)$	$-0.0055(0.004)$
Importance to seek fun	$-0.055^{***}(0.004)$	$-0.055^{***}(0.009)$	$-0.055^{***}(0.004)$
Importance of strong government	0.0075(0.004)	0.0075(0.006)	0.0076(0.004)
Joining social activities	$0.135^{***}(0.006)$	$0.135^{***}(0.012)$	$0.135^{***}(0.006)$
Last 7 days: housework or childcare	$0.076^{***}(0.011)$	$0.076^{***}(0.015)$	$0.075^{***}(0.011)$
Last 7 days: having paid job	0.0006(0.010)	0.0006(0.019)	0.0008(0.010)
Last 7 days: unemployed (jobseeker)	$-0.615^{***}(0.029)$	$-0.615^{***}(0.057)$	$-0.616^{***}(0.029)$
Last 7 days: unemployed (non-jobseeker)	$-0.455^{***}(0.031)$	$-0.455^{***}(0.051)$	$-0.457^{***}(0.031)$
Marital status	$-0.159^{***}(0.004)$	$-0.159^{***}(0.009)$	$-0.160^{***}(0.004)$
Religiosity	$0.038^{***}(0.002)$	$0.038^{***}(0.005)$	$0.038^{***}(0.002)$
Trust in people	$0.089^{***}(0.003)$	$0.089^{***}(0.004)$	$0.089^{***}(0.003)$
Socio-economic Controls			
GDP per capita	$-1.1e^{-6}(1.5e^{-6})$	$-1.1e^{-6}(1.5e^{-6})$	$-2.7e^{-6}(1.8e^{-6})$
Life expectancy	$0.037^{**}(0.014)$	$0.037^{*}(0.022)$	$0.059^{**}(0.029)$
Inflation	$-0.0091(0.006)$	$-0.0091(0.007)$	$-0.0126(0.009)$
Gini	0.0025(0.009)	0.0025(0.015)	0.0044(0.008)
Unemployment rate	$-0.034^{***}(0.005)$	$-0.034^{**}(0.011)$	$-0.035^{***}(0.005)$
Country Fixed Effects	✓	✓	✓
Year Fixed Effects			✓
Country-year Cluster	✓		✓
Country and Year Cluster		✓	

Table 10: Complete ESS Regression Results with Happiness as Explained Variable

Explained Var: Life satisfaction	**Model 1**	**Model 2**	**Model 3**
Recession Variables			
No recession	-0.0922*** (0.0323)	-0.0922*** (0.0217)	-0.1503*** (0.0357)
The first year after recession	0.1977*** (0.0435)	0.1977*** (0.0702)	0.1480* (0.0810)
Individual Controls			
Age	-0.0597*** (0.0024)	-0.0597*** (0.0056)	-0.0600*** (0.0024)
Age squared	0.0006*** ($2.2e^{-5}$)	0.0006*** ($5.0e^{-5}$)	0.0006*** ($2.2e^{-5}$)
Discriminated by ethnicity	-0.6186*** (0.0503)	-0.6186*** (0.0777)	-0.6229*** (0.0502)
Education level	0.0018 (0.0020)	0.0018 (0.0029)	0.0018 (0.0019)
Education years	0.0412*** (0.0056)	0.0412** (0.0149)	0.0393*** (0.0055)
Education years squared	-0.0010*** (0.0002)	-0.0010** (0.0004)	-0.0010*** (0.0002)
Feeling safe to walk alone	-0.1638*** (0.0080)	-0.1638*** (0.0159)	-0.1609*** (0.0079)
Frequency of meeting people	0.0876*** (0.0042)	0.0876*** (0.0056)	0.0891*** (0.0040)
Gender	0.0621*** (0.0096)	0.0621*** (0.0154)	0.0616*** (0.0094)
Have someone close	-0.4319*** (0.0210)	-0.4319*** (0.0260)	-0.4208*** (0.0206)
Health	-0.5814*** (0.0080)	-0.5814*** (0.0169)	-0.5797*** (0.0079)
Importance to be rich	0.0719*** (0.0048)	0.0719*** (0.0088)	0.0722*** (0.0048)
Importance to be safe	-0.0365*** (0.0045)	-0.0365*** (0.0071)	-0.0357*** (0.0045)
Importance of equal rights	0.0338*** (0.0055)	0.0338** (0.0101)	0.0341*** (0.0056)
Importance to follow rules	-0.0359*** (0.0038)	-0.0359*** (0.0063)	-0.0362*** (0.0038)
Importance to spoil oneself	-0.0644*** (0.0050)	-0.0644*** (0.0114)	-0.0641*** (0.0049)
Importance to help others	-0.0365*** (0.0055)	-0.0365*** (0.0108)	-0.0358*** (0.0055)
Importance of loyal to friend	-0.0544*** (0.0065)	-0.0544*** (0.0105)	-0.0549*** (0.0065)
Importance of safe surroundings	-0.0078 (0.0045)	-0.0078 (0.0075)	-0.0086 (0.0045)
Importance to seek fun	-0.0369*** (0.0047)	-0.0369*** (0.0096)	-0.0363*** (0.0047)
Importance of strong government	0.0261*** (0.0052)	0.0261*** (0.0072)	0.0262*** (0.0052)
Joining social activities	0.1569*** (0.0062)	0.1569*** (0.0144)	0.1575*** (0.0062)
Last 7 days: housework or childcare	0.0603*** (0.0137)	0.0603*** (0.0197)	0.0606*** (0.0134)
Last 7 days: having paid job	0.0078 (0.0116)	0.0078 (0.0226)	0.0080 (0.0116)
Last 7 days: unemployed (jobseeker)	-1.0129*** (0.0382)	-1.0129*** (0.0814)	-1.0168*** (0.0380)
Last 7 days: unemployed (non-jobseeker)	-0.6785*** (0.0397)	-0.6785*** (0.0844)	-0.6809*** (0.0395)
Marital status	-0.1202*** (0.0034)	-0.1202*** (0.0074)	-0.1216*** (0.0034)
Religiosity	0.0412*** (0.0026)	0.0412*** (0.0067)	0.0411*** (0.0026)
Trust in people	0.1235*** (0.0030)	0.1235*** (0.0051)	0.1234*** (0.0030)
Socio-economics Controls			
GDP per capita	$2.5e^{-7}$ ($1.8e^{-6}$)	$2.5e^{-6}$ ($2.9e^{-6}$)	$-5.6e^{-6}$** ($2.4e^{-6}$)
Inflation	-0.0017 (0.0086)	-0.0017 (0.0102)	-0.0188 (0.0113)
Life expectancy	0.0454*** (0.0159)	0.0454* (0.0226)	0.0368 (0.0354)
Gini	0.0039 (0.0102)	0.0039 (0.0176)	0.0051 (0.0099)
Unemployment rate	-0.0442*** (0.0057)	-0.0442*** (0.0095)	-0.0489*** (0.0058)
Country Fixed Effects	✓	✓	✓
Year Fixed Effects			✓
Country-year Cluster	✓		✓
Country and Year Cluster		✓	

Table 11: Complete ESS Regression Results with Life Satisfaction as Explained Variable

	Model 1	Model 2	Model 3	Model 4
Individual Controls				
Health		0.4914***		0.4880***
		(0.0050)		(0.0050)
Unemployed		-0.5492***		-0.5397***
		(0.0191)		(0.0190)
Employment status		0.0049*		0.0046*
		(0.0026)		(0.0026)
Handicapped		-0.1477***		-0.1418***
		(0.0175)		(0.0175)
Citizenship		-0.1260***		-0.1180***
		(0.0460)		(0.0458)
Paid work last 7 days		-0.0515***		-0.0448***
		(0.0174)		(0.0173)
Age of Individual		0.0142***		-0.0766***
		(0.0033)		(0.0065)
Single		-0.1442***		-0.1273***
		(0.0229)		(0.0228)
Widowed		-0.3780***		-0.3623***
		(0.0422)		(0.0424)
Divorced		-0.0425		-0.0344
		(0.0310)		(0.0308)
Separated		-0.4582***		-0.4516***
		(0.0356)		(0.0356)
Education With Respect to High School		-0.0196		-0.0405
		(0.0485)		(0.0485)
Number of Years of Education		-0.1213		-0.0989
		(0.0746)		(0.0747)
Concerns crime trends in Germany		-0.0168***		-0.0034
		(0.0051)		(0.0051)
Age squared		-0.0001		-0.0001***
		(0.0000)		(0.0000)
Years of education squared		0.0036		0.0029
		(0.0023)		(0.0023)
Total income		0.0000***		0.0000***
		(0.0000)		(0.0000)

Standard errors in parentheses

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

Table 12: Complete Regression Result of SOEP Main Models

	Model 1	Model 2	Model 3	Model 4
Recession Variables				
No recession	0.1312***	0.1170***	0.0819***	0.0392***
	(0.0108)	(0.0104)	(0.0143)	(0.0141)
The first year after recession	0.0067	0.0233	0.0958***	0.1785***
	(0.0108)	(0.0104)	(0.0124)	(0.0128)
Socio-economics Controls				
Unemployment rate			-0.0669***	-0.0726***
			(0.0031)	(0.0030)
Gini			0.0713***	0.1525***
			(0.0072)	(0.0083)
Inflation			-0.0329***	-0.0833***
			(0.0046)	(0.0051)
Life expectancy			-0.2048***	-0.0595***
			(0.0092)	(0.0104)
GDP per capita			-0.0000***	0.0000***
			(0.0000)	(0.0000)
Individual Fixed effects	✓	✓	✓	✓
Standard error cluster on individuals	✓	✓	✓	✓

Standard errors in parentheses

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

Table 12: Complete Regression Result of SOEP Main Models (Continued)