THE ECONOMICS OF HAPPINESS

AN EMPIRICAL ANALYSIS OF THE EFFECTS OF (UN-)EMPLOYMENT ON INDIVIDUAL LIFE SATISFACTION

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Verfasser: Steffen Rätzel

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Gutachter der Dissertation: Prof. Dr. Joachim Weimann

Prof. Dr. Ronnie Schöb

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CHAPTER 1

HAPPINESS ECONOMICS AND UN-(EMPLOYMENT) – AN INTRODUCTION[1]

1. INTRODUCTION

Unemployment has been one of the major problems in economic policy of our times. Its relevance has even gained importance in the course of the financial crisis that began with the collapse of the US real estate market in the early summer of 2007. Countries that had been examples for low unemployment rates, such as the US or the United Kingdom, suffer notably as a result of the economic crisis and are hit by unemployment with rates that are meanwhile higher than in many countries in Continental Europe. As a result, the issue of unemployment has become even more eminent on a global scale than it already had been.

The main focus of the political discussion regarding the outcome of unemployment is generally concerned with the "direct costs" of unemployment that arise from the underemployment of economic resources and the related income loss of the households. Unemployment, however, causes additional "indirect costs" in terms of non-pecuniary, psychological costs for the unemployed on the one hand and external effects of aggregate unemployment that could affect every individual in the society on the other hand.

The psychological costs of unemployment, mostly neglected by economists in the past, have been analyzed intensively by sociologists and psychologists. Unemployment causes not only a loss of income for the affected individuals but creates supplementary psychological welfare losses. Unemployment leads to a reduction of self-esteem and appreciation as well as social isolation. Jobless persons suffer from future insecurity and stigmatization. They also experience a deterioration of health and increasing depressions.[2] These psychological effects of losing one's job are additional to the income reduction. Jahoda, Lazarsfeld and Zeisel (1971) give an impressive report on the relevance of work, independently of its use as a means to earn income. In their book "Marienthal: The Sociography of an Unemployed

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[1] Parts of this chapter were written in collaboration with Andrew E. Clark and Andreas Knabe. See Clark, A. E., Knabe, A. and S. Rätzel (2009). "Boon or Bane? Well-being, Others' Unemployment, and Labor-Market Risk.", forthcoming in *Labour Economics*.

[2] Fryer and Payne (1986) as well as Feather (1990) provide a detailed review of the differentiated psychological effects of unemployment.

Community" that is based on their famous field study analyzing the psychological effects of unemployment, they state:

> "... nearly all of these accounts contain a sentence such this: "If only we could get back to work." This wish would be understandable enough on purely financial grounds, but it is repeatedly qualified by the disclaimer that it is not merely because of the money: If I could get back to the factory it would be the happiest day of my life. It's not only for the money; stuck here alone between one's own four walls, one isn't really alive." (p. 76)

Beside the individual psychological costs of joblessness, there are external effects of unemployment that could affect the employed as well as the unemployed. Unemployment may affect not only the well-being of the jobless person, but also that of their families, friends, neighbours, and others who are in contact with them. At an aggregate level, higher unemployment rates increase, for instance, the risk for the employed to lose their own job and decrease the possibility of the unemployed to find a new employment position. High unemployment tends to raise income inequality leading to welfare losses if individuals have a preference regarding an equal income distribution. There is, furthermore, a positive relationship between unemployment and crime. Additionally, people may prefer a situation with low unemployment levels against a situation with severe unemployment rates. A high employment level, in this case, would have the nature of a public good. Any individual in the society can benefit from a reduction of the unemployment rate and there is no consumption rivalry concerning this good.[3]

Economists have been rather reluctant to take these intangible effects into account. The main reason is the complexity of their measurement and determination of their effects. This reluctance decreased in recent years, particularly as a result of the successful evolution of a new field in economics – the "Economics of Happiness". The breakthrough of the happiness approach is related to a study that explores the intangible effects of unemployment. In their seminal paper, Clark and Oswald (1994) analyze the influence of unemployment on mental health. They find a substantial negative impact of unemployment on individual well-being. Following this work, a strand of further articles regarding this topic has emerged and laid therewith the foundation for this dynamically growing research field.[4]

In contrast to the traditional economic view to use individual decisions and revealed preferences, the happiness approach considers a global judgement of subjective well-being

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[3] Hartley et al. (1991), Clark (2003) and Scutella and Wooden (2006) inter alia.
[4] To be accurate, Easterlin (1974) had already used the approach in his well-known paper over thirty years ago but could not break the scepticism of economists at that time.

and life satisfaction.[5] Many extensive social surveys nowadays measure subjective well-being, which can be seen as an approximation to individual utility.[6] The most straightforward way to measure life satisfaction is to use the "Cantril Ladder" technique (Cantril, 1965), which contains a question like the one used by the German Socio-Economic Panel (GSOEP):

> *"We would like to ask you about your satisfaction with your life in general. Please answer according to the following scale: 0 means 'completely dissatisfied', 10 means 'completely satisfied'. How satisfied are you with your life, all things considered?".*

Using life satisfaction as the endogenous variable, regression analyses allow to empirically investigate the factors that influence individual well-being and to evaluate the intensity of the various influences. For example, this approach provides a possibility to analyze and evaluate the indirect costs of unemployment.

The four articles in this thesis explore and evaluate the psychological costs and the external effects of unemployment as well as the intangible impact of employment, respectively. The empirical analysis is based on the life satisfaction approach using the German Socio-Economic Panel.

The first article in Chapter 2 evaluates and quantifies (in monetary terms) the non-pecuniary costs of unemployment. By extending previous studies, this chapter develops a new quantification method. The results show that the non-pecuniary costs of unemployment are substantially reduced compared to estimations done in previous studies. Nevertheless, the psychological costs calculated with this modified quantification method are still about two times higher than its pecuniary costs. This confirms the high value of work for life satisfaction. Chapter 3 takes a deeper look why unemployment may have such strong negative psychological effects. One important factor is the future insecurity for the unemployed that increases following the job loss. In this chapter, we reassess the "scarring" hypothesis by Clark et al. (2001), which states that unemployment experienced in the past reduces a person's current life satisfaction even after the person has become reemployed. Our results suggest that the scar from past unemployment operates via worsened expectations of becoming unemployed in the future, and that it is future insecurity that influences individual well-being significantly. Chapter 4 is devoted to the study of the external effects of unemployment and the question whether unemployment leads to lower life satisfaction levels even if the person himself is not directly affected. This essay investigates the relationship

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[5] I will use the terms life satisfaction, well-being, and happiness interchangeably.
[6] See Frey and Stutzer (2002), Di Tella et al. (2003) and Clark et al. (2007).

between the subjective well-being of both the employed and unemployed in relation to regional unemployment rates. We find that both employed and unemployed men suffer from regional unemployment, unemployed men are, however, significantly less negatively affected. This is consistent with a social norm effect of unemployment in Germany, which means that one's own unemployment represents a smaller deviation from the social norm as more people become unemployed. Chapter 5 goes a step further and is devoted to the question to what extent work and working time influence happiness. People without work are consistently less happy, even after controlling for income differences. But it is an open question whether work and especially the associated working time exerts, argumentum e contrario, positive intangible effects. In this paper, we analyze the impact of working time on individual well-being. The results show positive utility effects caused by employment and working time. Happiness correlates positively with hours worked. However, there is an inverse U-shaped relationship – excessive hours have a negative impact on happiness. Additionally, the results show the importance of exogenously given deviations of working time from the individually preferred labour supply. These discrepancies reduce well-being and counterbalance the positive effects of work.

The main objective of the dissertation is to shed more light on the comprehensive influence of one of the most important domains in the life of human beings – one's own work and employment status. The remainder of this chapter presents a literature review on the effects of unemployment and life satisfaction. We conclude by giving a detailed overview of the four studies contained in this dissertation.

2. HAPPINESS ECONOMICS AND (UN-)EMPLOYMENT

The influence of work on individual well-being has been studied intensively by sociologists and psychologists in the last decades. Economists have been engaged in that topic with a time-lag but in the course of the increasing relevance of the happiness research a multiplicity of articles have been written in recent years. The first section of this literature review outlines the individual non-pecuniary effects of unemployment whereas the second part summarizes the literature regarding the external effects.

2.1 The Non-Pecuniary Effects of Unemployment

Numerous psychologists have been and still are engaged in researching the impact of the loss of the job on individual well-being. It is well-established in social psychology that own unemployment is amongst the most detrimental of experiences for individual well-being.

Eisenberg and Lazarsfeld (1933, 1971) were the first psychologists who conducted a descriptive study of the negative emotional effects of unemployment. They showed that job loss deprives individuals not only of their labour income, but also of the non-pecuniary benefits of work. These latter include the external imposition of a time structure on the working day, regularly-shared experiences and contact with people outside of the family, links to goals and purposes that transcend the individual, the definition of personal status and identity, and the enforcement of activity (Jahoda 1981, 1988). Unemployment is destructive mainly because it withdraws these latent functions from individuals.[7] Since then, numerous psychologists have dealt with the effects of unemployment on mental well-being (Feather 1990, Björklund and Eriksson 1995, Darity and Goldsmith 1996) and health (Wilson and Walker, 1993; Jin et al. 1995). Fryer and Payne (1986) and Argyle (2001) showed furthermore the negative impact of unemployment on subjective measures like individual happiness and well-being.

Using subjective well-being data met, however, with a refusal by economists until the mid 90's because of sceptics concerning the validity and reliability of the subjective data. This view changed following the seminal paper by Clark and Oswald (1994) and happiness economics has become a very popular field of research in economics recently. The development has been dynamically and published papers have increased tremendously and can be found in every high rank economic journal these days.[8] Clark and Oswald (1994) have been the first economist that showed that unemployment is associated with significantly lower mental well-being scores, as measured by the answers to twelve psychological functioning questions (the GHQ-12, using the first wave of the British Household Panel Survey). Following Clark and Oswald (1994), a wide range of economic articles regarding the influence of the employment status on life satisfaction has emerged. Other economists followed and made use of the direct information on life satisfaction from the GSOEP. Gerlach and Stephan (1996) analyze the effects of unemployment in Germany and find high non-pecuniary costs following the loss of the job. Winkelmann and Winkelmann (1995) quantify the non-pecuniary costs of unemployment through equivalent income compensations. Using German data for the period 1984-1989, they estimate that men (women) have to receive a compensation of 277 (80) percent of their income to restore the loss of happiness from unemployment. They assume that the average pecuniary loss from unemployment is 40 percent of income, so that the total individual costs of unemployment can be divided in 13

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[7] Feather (1990) presents a comprehensive survey of the social psychology literature on the psychological impact of unemployment.
[8] See Clark et al. (2007) for the number of recently published articles.

percent pecuniary and 87 percent non-pecuniary costs for men and in 33 percent pecuniary and 67 percent non-pecuniary costs for women. In a follow-up study, Winkelmann and Winkelmann (1998) show that these results are robust also for other estimation techniques. More recent work in economics on subjective well-being has produced overwhelming support for these findings. Blanchflower and Oswald (2004) find similar results for Great Britain and the United States, Korpi (1997) for Sweden and Woittiez and Theeuwes (1998) for the Netherlands. Di Tella et al. (2001) and Clark (2006) provide further evidence for the deteriorating impact. A review of the main results can be found in Frey and Stutzer (2000, 2002).

In summary, it can be stated that unemployment exerts a substantial negative impact on individual well-being. The main effect is not driven by the individual income loss but operates via the psychological costs caused by unemployment. Emotional instability, social isolation and stigmatisation, loss of self-confidence, status and appreciation, depression and future insecurity are associated with unemployment and affect individual well-being negatively. The result has become standard and has been confirmed across different countries and data sets.

2.2 The External Effects of Unemployment

Research in social psychology has suggested that unemployment affects not only the mental well-being of those concerned, but also that of their families, colleagues, neighbours, and others who are in direct or indirect contact with them. Evidence on the negative intra-familial consequences of unemployment goes back at least to the Great Depression, when Oakley (1936) reported that the unemployment of German parents produced a drop in their children's school grades of two-thirds.[9] More recent work has found that children with unemployed fathers are at risk of socio-emotional problems, deviant behaviour, and reduced aspirations and expectations (McLoyd, 1989). Unemployment is also harmful for the mental health of spouses. McKee and Bell (1986) underline the difficulties faced by spouses, typically the wives of unemployed men, in trying to cope with the partner's intrusive presence at home, supporting distressed partners and dealing with intra-family conflict. Jones and Fletcher (1993) provide further evidence that the occupational stress and distress from unemployment can be transmitted between partners.

At a broader level, unemployment may also affect the employed. One strand of the literature has considered "survivors" – those who remain in organisations after their colleagues have been made redundant. Higher unemployment increases individuals'

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[9] More recent evidence for Dutch families is presented in Te Grotenhuis and Dronkers (1989).

perceptions of their own future unemployment prospects (and by more than the actuarial rise in risk). Cobb and Kasl (1977), Fryer and McKenna (1987, 1988), and De Witte (1999) have all emphasised that the anticipation of redundancy is at least as distressing as the experience of unemployment itself. Hartley *et al*. (1991), in their survey of job insecurity, found that those with falling perceived job security also report severe uncertainty in other life areas, impaired mental health (as expressed by psychosomatic symptoms and depression), lower job satisfaction, reduced organisational commitment and trust in management, resistance to change and deteriorating industrial relations. Nelson *et al*. (1995) and Ferrie *et al*. (1995) present evidence from case studies in the UK in which formerly public organisations were privatised and parts of the workforce were made redundant. These privatisations increased the perceived job insecurity of employees and caused significant falls in their mental well-being. Dekker and Schaufeli (1995) present complementary evidence showing that, after it had become clear who would be laid off, those who knew that they would be made redundant actually experienced a rise in their well-being. This illustrates the harmful impact of job insecurity compared to actually becoming unemployed.

Even without a job security effect, surrounding unemployment may still reduce employees' well-being. Workers who see their co-workers becoming unemployed may suffer some psychological impact as well. Managers in firms where layoffs took place report that these had deleterious effects on the remaining workers' productivity, morale and commitment to the firm (Brockner, 1988 and 1992). Survivors have feelings of guilt, show poor concentration and increasingly seek alternative employment (Noer, 1993). In addition, Cooper (1986) shows that occupational stress, which workers typically react to by changing jobs, increases with unemployment as individuals are more likely to be stuck in mentally-distressing jobs.

The externalities from higher unemployment are not restricted to employees, but also affect those who were already unemployed. Here the sign of the externality may change: higher unemployment may be beneficial (or at least less harmful) for the unemployed. The social psychology literature provides some evidence. Kessler *et al*. (1987, 1888) find that support from others reduces the negative impact of unemployment by helping the unemployed to escape from boredom and establish a goal direction in daily activities. It is easier for the unemployed to establish social contacts if others in the local area are also unemployed. Cohn (1978) finds that the unemployed's satisfaction with self is lower if there is no external cause to which unemployment can be attributed. Satisfaction among the unemployed is higher in regions with higher local unemployment rates. Jackson and Warr (1987) find similar results for the UK. Unemployed men in England and Wales have significantly better psychological

health if they live in areas where unemployment is chronically high compared with those living in areas with moderate or low unemployment. Dooley *et al.* (1988), however, find that the aggregate unemployment rate has a negative impact on the unemployed when investigating psychological symptoms in the Los Angeles area.

While social psychology has contributed very detailed accounts of particular case studies and qualitative research, economists have recently started to make use of large-scale datasets to quantitatively examine the effect of unemployment on others. Clark (2003) uses seven waves of the BHPS to examine the impact of other's unemployment on both the employed and the unemployed. Other's unemployment is measured at the regional, household, and couple level. While surrounding unemployment generally has a negative effect on the employed at all three levels, there is evidence of a counteracting effect for unemployed men, whose well-being rises with others' unemployment. These results are consistent with a utility return from adhering to an employment norm. They are consistent with work on suicides and para-suicides by the unemployed, which have been shown to be more prevalent in low-unemployment regions (Platt and Kreitman, 1990, and Platt *et al.*, 1992).

Work in other countries or with other datasets generally finds similar results. Using Australian data, Shields *et al.* (2009) show that people suffer less from unemployment if they live in a region with higher unemployment. Powdthavee (2007) finds a weaker social norm effect in South Africa. His findings suggest that unemployed people suffer much less from regional unemployment than employed people, but they still suffer nevertheless. Social norm effects also appear for the informally employed (casual wage employees), whose life satisfaction is less adversely affected by regional unemployment than that of regularly employed workers.

Shields and Wheatley Price (2005) use an index of multiple deprivation at the regional level that consists of six deprivation domains (low income, employment, education and training, poor health and disability, poor housing, and poor geographical access to services). They show that the detrimental effect of unemployment on psychological health is greater in low employment-deprivation areas than in highly-deprived areas. However, Scutella and Wooden (2006), using Australian data, do not find any social norm effect at the household level: the well-being of the unemployed rather worsens as other household members become unemployed.

A different approach to modelling the prevalence of an (un)employment norm was taken by Stutzer and Lalive (2004), who infer the social work norm in Swiss cantons from the outcome of a referendum in which the population voted on cuts in unemployment benefits.

Stronger cantonal support for this cut is interpreted as corresponding to a stronger social norm of work. The results show that a weaker work ethic goes hand in hand with greater subjective well-being of the unemployed.

The external effects have an impact on the employed as well as the jobless persons. The employed suffer from, for example, increased job insecurity, feelings of guilt, and higher workloads. However, the impact is not as clear for those who are already unemployed. Any social norm effect mitigates this effect for the unemployed, and may even turn it positive.

Overall, the literature clearly provides evidence of both adverse psychological effects of own unemployment, as well as external effects on others. The following chapters will address open research questions and will provide new insights concerning the relationship of unemployment and happiness.

3. THE ESSAYS

The remainder of this chapter gives an overview of the four articles. Each of the chapters is written in the style of a self-contained article.

Chapter 2

Quantifying the Psychological Costs of Unemployment: The Role of Permanent Income

The first essay is devoted to the evaluation and quantification of the psychological costs of unemployment. The strong welfare losses following the loss of the job are confirmed by a wide range of studies. Subjective well-being is reduced by more than what can be attributed to the direct income loss. In other words, when comparing two identical individuals who both receive the same income but one of whom is unemployed, one will find that the unemployed person states to be less happy than the employed person. The (monetarized) difference is typically interpreted as the psychological costs of unemployment. Studies trying to evaluate these effects found, however, disproportionately high costs if one tries to calculate the amount of income that would be necessary to compensate the individual for these psychological costs (up to seven times of the yearly wage).

The first reason for the high values is the substantial negative effect of unemployment found in empirical estimations using life satisfaction data. A second explanation can be found in the weak influence of income on individual well-being. Due to the small influence of income a high amount of money would be necessary to compensate for the noticeable negative effect of unemployment. The apparently weak income effect provides the basis for this article. We argue that the standard method of quantifying the non-pecuniary costs of

unemployment leads to distorted results because it implicitly assumes that changes in current income only affect current well-being. However, when a person receives additional income, he spreads part of it over his entire lifetime to smooth his consumption path. According to Friedman's (1957) permanent income hypothesis, households base their consumption decisions on their permanent rather than current income. This exerts an influence on the quantification of psychological effects through compensation variations because consumption smoothing also causes higher life satisfaction outside the time period in which a person's income is actually raised. The standard methods, though, only look at the period in which unemployment occurs and ignore therewith the positive income influence on well-being in other time periods. This leads to an underestimation of the effect of income on individual happiness and therefore to an overestimation of the necessary income compensation for unemployment. To correct the overestimation bias we develop a modified monetary equivalence measure to evaluate the non-pecuniary costs of unemployment that distinguishes between temporary and permanent income changes.

The results of the paper confirm our prior expectation and are more cautious than those of previous studies.[10] The estimated psychological costs of unemployment are reduced by more than one-half using the new method. This has methodological implications. Since the life-satisfaction approach is commonly used to quantify the value of non-marketable goods the standard method generally overestimates the value of these goods.[11] To avoid this systematic bias it is necessary to take the intertemporal effects of income compensations into account.

Independently of the evaluation method, we find that the unemployed suffer substantially from losing their job. The psychological costs of unemployment are about 80 percent of their previous income for men and 55 percent for women. Thus, the non-pecuniary, psychological costs are larger than the accompanied income loss caused by losing the job which leads to a substantial increase of the cumulative individual costs of unemployment. Hence passive labour market policies cannot compensate people for their job losses. Instead employment policies that enable an expeditious re-employment are necessary to effectively avoid the occurring psychological costs.

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[10]   See for instance Winkelmann and Winkelmann (1995, 1998), Blanchflower and Oswald 2004.
[11] The approach has been used to quantify the effects of pollution (Welsch 2002), noise exposure (van Praag and Baarsma 2005), terrorism (Frey et al. 2004), climatic differences (Rehdanz and Maddison 2005), the fear of crime (Moore 2006), and corruption (Welsch 2008) inter alia.

Chapter 3

Scarring or Scaring? The Psychological Impact of Past Unemployment and Future Unemployment Risk

The second paper builds on the previous article but takes a step forward and examines one of the reasons why unemployment causes high psychological cost. One of the main drivers is the increase in future insecurity if a person is hit by unemployment. People who lose their job face insecurity about the time at which they will find a new job, and whether they will find one at all again. Our data show that the time a person has been unemployed in the past is correlated with this person's perception of future unemployment risk. Hence, their future employment prospects worsen, leading to a feeling of future insecurity that decreases well-being.

This essay is thereby closely related to the paper by Clark et al. (2001), who showed that unemployment experienced in the past reduces a person's current life satisfaction. We argue, however, that the person infers from past unemployment that he is also more likely to be unemployed in the future. Hence, the drop in life satisfaction is not directly caused by past unemployment, but to a large degree by the fear of future unemployment and that it is the future insecurity that generates the life satisfaction deprivation.

To analyze this hypothesis, we estimate a new model by including different measures of the likelihood of future unemployment in our regression model to estimate the simultaneous impact of past unemployment and future insecurity. Our findings strongly support the future insecurity hypothesis. The inclusion of future expectations as a separate predictor of life satisfaction substantially weakens the results found by Clark et al. (2001). Once we control for insecurity, past unemployment loses much of its explanatory power for current life satisfaction. We do find, however, that the prospect of being unemployed in the future is highly detrimental to current life satisfaction. Low job security for the employed and unfavourable re-employment chances of the unemployed are harmful to subjective well-being. Thus, the psychological costs of unemployment are dependent on the evaluation of future labour market chances.

Taking future unemployment risk into account captures a large proportion of the negative well-being effect previously assigned to unemployment. Current unemployment is not as bad as previous studies suggested if the individual has bright future prospects. The results show, for instance, that women are not negatively affected by unemployment at all as long as their future prospects of finding a new job are promising. Additionally, the findings suggest that an employed person with a high risk of losing his job has a lower well-being level than an

unemployed person who can find a new job easily. These results give new insights concerning the psychological costs of unemployment. Future insecurity is to a large extent responsible for the non-pecuniary costs of unemployment that causes the sharp drop of well-being.

Chapter 4

Unemployment as a Social Norm in Germany

After the examination of the psychological costs in the last two chapters, the external effects of unemployment are addressed in Chapter 4. A separate strand of literature has underlined the relationship between individual well-being and others' unemployment. In this paper, we concentrate on the relationship of individual well-being and the unemployment rate as an aggregate macroeconomic variable. The hypothesis is that a higher unemployment rate is negatively correlated with the happiness of employed people but there may be a mitigating "social-norm effect" for the unemployed (as more people become unemployed, one's own unemployment represents a smaller deviation from the social norm resulting in higher life satisfaction levels).

Perhaps the most obvious relationship for the employed is job security that is generally decreasing with rising unemployment. Other channels of influence that have been emphasised in the psychological literature include the feelings of guilt experienced by those remaining employed during periods of layoffs, and individuals staying in distressing jobs that they would otherwise likely have quit had labour market conditions been better.

The effect of aggregate unemployment on the unemployed is arguably more contentious. Greater unemployment reduces the chances of finding work for a given unemployed person, absent some kind of powerful thick-market externality, which makes their future prospects greyer. On the other hand, the unemployed may benefit from the addressed social-norm effect.

The results show that employed individuals feel worse in regions with higher unemployment, in line with our hypothesis. We also find evidence of a social norm effect for unemployed men that is, however, too weak to counterbalance the generally negative effect of the unemployment rate. A higher unemployment rate is negative for the society, but it hurts the employed more than the unemployed.

The policy implications resulting from the findings are evident. The mitigating social norm effect may lead to unemployment hysteresis. If the well-being gap between the employed and the unemployed is reduced through higher unemployment, the incentives for the unemployed to participate in the labour market decrease. A temporary labour market shock can thus have

long-lasting consequences. Policies to avoid high regional unemployment rates need an immediate implementation. If the time elapses, a new social norm of higher unemployment might become established making it even harder to lower unemployment to his old level.

Chapter 5

Labour Supply, Life Satisfaction and the (Dis-)Utility of Work

Chapter 5 resumes the findings of the psychological impact of unemployment from Chapter 2 and 3 and starts the analysis from the opposite side. If unemployment causes significant well-being losses even after controlling for income, should not work and working time in reverse generate positive effects for one's life satisfaction? If unemployment has a negative impact, the possibility to work should consequently increase well-being (even if the income is held constant). To analyze the effects of work we regress life satisfaction data on wages and real working hours and concentrate on all individuals that are active in the labour force with a strictly positive amount of working time. Focusing on this subgroup allows me to examine the effects of working time on individual life satisfaction and to control simultaneously for the earned wage rate. Hence, it is possible to separate the well-being effects of working time from the wage influence and therefore to estimate the pure non-pecuniary effect of working hours. The objective is to gain more insights in the effects of work, wages and working time on individual happiness. Furthermore, the econometric analysis allows me to examine the trade-off between wages and working hours at a constant well-being level. By using compensating variation, the optimal wage that compensates the individual for an additional working hour can thus be determined.

The second aim of the paper follows from the assumption that real working time is often not identical to the individually preferred labour supply time. Employees can generally not freely choose their working time but are rather restricted to specific contracts and compulsory working hours. The GSOEP provides data on how many hours people prefer to work. By using the difference between actual and preferred working hours we are able to analyze the influence of underemployment (employees would prefer longer working hours) and overemployment (employees would prefer shorter working hours) on individual life satisfaction. This is particularly interesting because the deviation is exogenously given. Since one could argue that individuals can choose their optimal labour hours according to their preferences, working time would be endogenously determined. Consequently, a positive correlation between chosen working hours and life satisfaction were not surprising because it is driven by the rational decision to offer the preferred hours of work. However, taking the

deviations into account allows the estimation of the influence of working time on life satisfaction that is purely exogenously driven.

The estimation results suggest that work exerts indeed a positive well-being effect. We found that the changing one's status from unemployment to employment enhances well-being even if the working hours are small. This is evidence that the psychological effect of work is partly caused by belonging to the employed group and thus avoiding the stigma of unemployment. Furthermore, we found a hill-shaped relationship between working hours and life satisfaction. Men benefit from increasing working hours up to an optimal amount of around seven hours a day. Increasing working time further reverses the relationship and reduces well-being. The optimal working time for women is lower at about four hours a day, with decreasing impact afterwards.

Since the happiness maximizing labour time is lower than the average actual working time for both sexes, the neoclassical assumption of marginal labour disutility is supported. At the margin, labour does indeed cause disutility for the majority of the employed. Nevertheless, the total utility of work is, in line with the happiness literature, positive rather than negative.

The estimation results of the exogenous over- and underemployment confirm the findings above. Working time has a positive impact on well-being but exogenous deviations from the preferred labour time are negatively correlated with happiness. In particular, working more than preferred appears to have a substantial negative influence.

This thesis promotes the idea that the work and the employment status exert non-pecuniary effects on individual life satisfaction. The results show that work occupies a central role in human well-being. Work is not only an inevitability to earn income for consumption but it also generates positive non-pecuniary effects.

CHAPTER 2

QUANTIFYING THE PSYCHOLOGICAL COSTS OF UNEMPLOYMENT: THE ROLE OF PERMANENT INCOME[12]

1. INTRODUCTION

Unemployment has a large negative effect on individual well-being. It typically generates lower self-esteem, uncertainty about the future, social isolation, stigmatization, health problems, and mental disorder. To evaluate the economic costs of unemployment, it is thus not sufficient to take only its pecuniary costs, such as individual income losses or the fiscal cost of welfare benefits and foregone taxes, into account. One also has to consider the non-pecuniary, psychological costs of unemployment.

The recent progress in life satisfaction research provides a new approach to evaluating various types of non-marketable goods, public goods and externalities. Using subjective well-being data from social surveys as a proxy for utility,[13] the impact of unemployment can be quantified by calculating the amount of income necessary to compensate the individual for the change in well-being associated with the loss of one's job. The amount by which the required compensation exceeds the pure income loss from unemployment indicates the non-pecuniary cost of being unemployed. Previous studies applying this life satisfaction approach found a significant drop in an individual's subjective well-being upon entering unemployment even if one fully compensated the person for the direct income loss.[14] For example, Winkelmann and Winkelmann (1995) calculate the non-pecuniary costs of unemployment for Germany and show that men would have to receive an additional compensation of 277 percent of their income to restore the psychological loss from unemployment. For women, the non-pecuniary costs are smaller, so that 80 percent compensation would suffice. With an average pecuniary loss from unemployment of 40 percent of income (in case of Germany), the non-pecuniary costs of unemployment are thus about seven times larger than the direct pecuniary costs for

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[12] This chapter was written in collaboration with Andreas Knabe. See Knabe, A. and S. Rätzel (2009). "Quantifying the psychological costs of unemployment: the role of permanent income", forthcoming in *Applied Economics*.

[13] The relationship between subjective well-being and utility is explored, inter alia, by Frey and Stutzer (2002) and Clark et al. (2008).

[14] See Clark and Oswald (1994), Gerlach and Stephan (1996), Korpi (1997), Clark et al. (2001), Frey and Stutzer (2000, 2002), Clark (2003, 2006), DiTella et al. (2003), and Frijters et al. (2006).

men and twice as large for women. Applying essentially the same method, Blanchflower and Oswald (2004) find large non-pecuniary costs of unemployment also for the United States and for Great Britain.

We argue that this standard quantification method is flawed as it implicitly assumes that changes in current income only affect current well-being and thereby ignores that individuals will shift part of a temporary income change to other life periods to smooth their consumption stream over time. If reported life satisfaction depends on how much an individual actually spends on consumption rather than how much he earns at a given point in time, the standard quantification method leads to distorted results because it does not distinguish between transitory (current) and permanent (lifetime) effects of income changes. The necessity to distinguish between these two effects follows from Friedman's (1957) permanent income hypothesis (PIH), which states that households base their consumption decisions on their permanent rather than current income, where permanent income is the expected annuity obtainable from the discounted value of lifetime resources.[15] The PIH has strong implications for the quantification of non-pecuniary effects through "compensating income variations" because temporarily granted income compensations will also affect permanent income, so that subjective well-being is not only raised during the actual compensation period, but also outside of it. For example, if a person is compensated for the psychological loss during some unemployment spell, the PIH claims that she would consume only a part of the compensation payment while unemployed. To smooth her consumption path, she would spread its greater part over her entire life horizon, which would increase her life satisfaction outside her unemployment episode as well.

When applied to quantifying the non-pecuniary costs of unemployment, ignoring the positive effect of current income compensations on well-being at other times in life will underestimate the true impact of income on (lifetime) well-being, and thus overestimate the necessary monetary compensation. A simple example might illustrate this point. Consider an individual over a 2-year time horizon who is unemployed during the first year (but is compensated for the pure income loss), and is employed in the second year. Suppose that unemployment reduces life satisfaction by 1 point (on a 0-10 scale), which has to be balanced by an additional income compensation. Empirical studies show that the impact of a temporary change in income on life satisfaction can be decomposed into two effects (see van Praag et al.

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[15] There is strong empirical evidence for the PIH. For example, DeJuan and Seater (1999, 2006) show that permanent income has a highly significant influence on individual consumption decisions. For comprehensive surveys of the literature on empirical tests of the PIH, see Deaton (1992), Browning and Lusardi (1996), Browning and Crossley (2001), and Meghir (2004).

2003). First, there is a temporary, perhaps psychological shock that raises life satisfaction the moment the additional income accrues. Second, there is a permanent effect that arises from smoothing the additional consumption possibilities over time. For our example, assume that an increase in income of 100 percent during the first year causes a temporary shock of 0.2 life-satisfaction points. Moreover, assume that spreading the increased consumption possibilities raises life satisfaction by 0.3 points in each of the two years. Hence, adding the effects in both years shows that a 100 percent income compensation during the first year raises total well-being by 0.2 + 2(0.3) = 0.8 points. Compensating the unemployment loss of 1 point thus requires an income compensation of 1 / 0.8 = 125 percent.

The standard approach of quantifying the non-pecuniary costs of unemployment, however, implicitly assumes that there are no intertemporal effects of income changes and thus ignores the second period. Consequently, it appears as if a 100 percent rise in income increases life satisfaction only by 0.2 + 0.3 = 0.5 points, so that a compensation of 1 / 0.5 = 200 percent would be necessary to balance the psychological loss from unemployment. This example highlights the importance of taking intertemporal spillovers of temporary income compensations into account to avoid overestimating the non-pecuniary costs of unemployment.

To account appropriately for the role of permanent income described by the PIH, we distinguish between transitory and permanent income changes, and thereby develop a more precise monetary equivalence measure for evaluating the non-pecuniary costs of unemployment. Using data from the German Socio-Economic Panel, we then reevaluate the non-pecuniary costs of unemployment and compare the results to those derived by standard quantification techniques in previous research. Our empirical results support our theoretical reasoning that the standard method overestimates the non-pecuniary costs of unemployment. In our estimation, the standard method predicts that the non-pecuniary costs of unemployment are approximately 160 (130) percent of income for men (women), whereas the permanent income method shows that the non-pecuniary costs, though still important, are only about 80 (55) percent. The psychological costs of unemployment are two times higher than the pecuniary costs for men and are one-third higher than the pecuniary costs for women.

We will proceed as follows. In the next section, we describe the life satisfaction approach to quantifying psychological effects, address the role of permanent income, and present our quantification method. Section 3 describes the data, and Section 4 contains the empirical results. The quantification of the non-pecuniary cost of unemployment follows in Section 5 and Section 6 discusses some generalization of our approach and concludes.

2. METHODOLOGY

The true, but unobservable level of life satisfaction LS^* can be explained by a number of factors, where the functional relationship can be written as:

$$LS_{it}^* = \alpha + \beta_1 \ln Y_{it} + \beta_2 \ln \overline{Y}_i + \beta_3 UE_{it} + \beta_4 LTUE_{it} + \gamma X_{it} + \nu_i + \mu_t + \varepsilon_{it} . \qquad (1)$$

In equation (1), the index i denotes a specific individual, and the index t a specific year. To account for the intertemporal effects of income described by the PIH, we separate the influence of transitory and permanent income. Y_{it} denotes the net income of individual i in year t (transitory income), and $\overline{Y}_i$ is the average income of individual i averaged over all the years in the panel (permanent income).[16] UE_{it} is a dummy that signals whether or not the individual is unemployed in year t. $LTUE_{it}$ is an additional dummy that controls for the length of the unemployment spell. If an individual is unemployed at time t and has already been unemployed at time t-1, $LTUE_{it}$ takes on a value of one. If a person is not unemployed at time t or has not been unemployed at time t-1, $LTUE_{it}$ is zero. With this variable, it is possible to check whether people adapt to the state of unemployment over time or whether long term unemployment is as bad as short term unemployment. The vector X_{it} contains information on other factors that can potentially explain an individual's life satisfaction. α is a constant, ν_i is an individual-specific effect that captures time-invariant differences between individuals, μ_t is a time-variant effect denoting influences in a specific year that affect all individuals equally, and ε_{it} is a random error term.

The coefficients can be interpreted as follows. β_1 says how strongly an increase in transitory income, at a constant permanent income $\overline{Y}_i$, affects life satisfaction. β_2, on the other hand, denotes the impact of an increase in permanent income, at a constant transitory component, on current life satisfaction. Consequently, the sum ($\beta_1 + \beta_2$) yields the effect of an increase in income over the whole time horizon on current life satisfaction. Transitory and permanent income are expected to influence life satisfaction positively ($\beta_1 > 0$ and $\beta_2 > 0$). The coefficient β_3 denotes the difference between the life satisfaction of an employed and an unemployed person with otherwise identical characteristics, which we expect to be negative ($\beta_3 < 0$). The additional affect of long-term unemployment is estimated by β_4. The coefficients

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[16] We follow van Praag et al. (2003) in defining permanent income by the average income over all years a person is in the panel. Intuitively, and abstracting from impatience and interest effects, if the individual knows his past and future income streams and wants to smooth consumption, he will consume his average lifetime income in each period. We use logarithmic income to account for the non-linear influence of income on individual happiness.

in vector γ measure the influence of other exogenous factors (e.g. age, sex, family status, and health) and serve as control variables to secure the comparability of different persons.

The individual level of life satisfaction cannot be observed directly. To quantify it, one has to revert to individuals' subjective assessments about their well-being as stated in social surveys. The true level of well-being is translated into scaled values (e.g. from 0 "completely dissatisfied" to 10 "completely satisfied"), so that an ordinal measure of life satisfaction, *LS*, is observed instead of its true level LS^{*}:

$$LS_{it} = z \Leftrightarrow LS_{it}^{*} \in \left[\lambda_{z-1}, \lambda_{z} \right[\qquad z \in \{0,1,...,10\}, \qquad (2)$$

where $\lambda_{-1} = -\infty$ and $\lambda_{10} = \infty$. An individual states a value z on a life satisfaction scale from 0 to 10 if his true life satisfaction is between λ_{z} and λ_{z+1}. We take the ordinal structure of the variable to be explained, *LS*, into account by conducting an ordered probit estimation. The estimated coefficients then allow determining the probability with which stated life satisfaction takes on a certain value, depending on the values of the explanatory variables. We write this probability in the form:

$$P\left(LS_{it} = z \big| Y_{it}, \bar{Y}_{i}, UE_{it}, LTUE_{it}, X_{it} \right) \qquad z \in \{0,1,...,10\}. \qquad (3)$$

The non-pecuniary costs of unemployment

To determine the non-pecuniary costs of unemployment, we distinguish between a truncated and an extended model.

In the truncated model (Winkelmann and Winkelmann 1995, 1998; Blanchflower and Oswald 2004), a monetary compensation, which is paid only while unemployment persists, affects well-being only during the unemployment spell. Changes in permanent income do not affect well-being, which amounts to assuming $\beta_2=0$ in the econometric model (1). The compensation κ necessary to make an unemployed person as well off as an otherwise identical employed person is implicitly given by: [17]

$$P\left(LS_{it} = z \big| Y_{it}, UE_{it} = 0, X_{it} \right) = P\left(LS_{it} = z \big| (1+\kappa) Y_{it}, UE_{it} = 1, X_{it} \right) \quad \forall z \in \{0,1,...,10\}. \quad (4)$$

The left hand side of (4) is the probability that an employed person states a life satisfaction of z. The right hand side is the probability that an identical unemployed person, who receives an income compensation of $\kappa*100$ percent, states the same level of life satisfaction. The value of

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[17] According to (1), the explanatory variables on both sides of (4) should also include *LTUE_{it}* if unemployment lasts longer than one year. Our empirical estimates show, however, that *LTUE* does not have a significant effect on well-being. To ease the exposition, we thus do not consider it in this section anymore.

the compensation κ, at which both probabilities are equal for all possible values on the life satisfaction scale, determines the monetary equivalent to the non-pecuniary costs of unemployment. Applying the ordered probit method, the necessary compensation can be calculated through direct comparison between the coefficients of income (β_1) and unemployment (β_3). With a compensation

$$\kappa = \frac{-\beta_3}{\beta_1},$$ (5)

the impact of unemployment and income compensation on well-being would exactly balance, so that the estimated probabilities of stating a certain level of life satisfaction remain unchanged (see Winkelmann and Winkelmann 1998).

As already mentioned above, the truncated model implicitly imposes the restriction $\beta_2=0$, which causes a misspecification and thereby distorts the estimates of model (1) due to an omitted variable bias. To overcome this problem, we will contrast the truncated model with a model extended by permanent income.

The distortion generated by the omission of $\overline{Y}_i$ in the truncated model consists of two opposing effects. On the one hand, one could expect that $\overline{Y}_i$ is strongly correlated with Y_{it}. If permanent income $\overline{Y}_i$ has a positive effect on life satisfaction in the extended model, the omitted variable bias causes a large part of this effect to be assigned to current (transitory) income Y_{it} in the truncated model. Hence, the impact of transitory income on life satisfaction (β_1) is overestimated, so that the non-pecuniary costs of unemployment are underestimated. On the other hand, a temporary income compensation increases average lifetime, i.e. permanent, income. A positive influence of $\overline{Y}_i$ on life satisfaction would then mean that a person would benefit from such an income compensation not only during the unemployment spell, but also at all other points in life. Hence, a temporary compensation has a much stronger effect on well-being in a lifetime perspective than would be implied by restricting the analysis' time frame only to the actual unemployment episode. Since a smaller compensation would suffice to restore well-being measured over the entire lifetime, this second effect moderates the size of the non-pecuniary costs of unemployment.

The extended model (1) avoids these distortions because it accounts for the change in permanent income. To determine the necessary compensation, one has to compare the satisfaction loss from unemployment with the gains from a temporary compensation during the unemployment spell plus the gains from an increased permanent income during the rest of

a person's lifetime, and find the compensation that exactly balances these effects. The change in life satisfaction during and outside the unemployment spell cannot directly be compared because well-being data is ordinal. This problem, however, can be overcome with a hypothetical two-part compensation scheme. The first part of the compensation is paid during the unemployment spell and restores the probability of stating the same life satisfaction value as an employed person. This compensation raises permanent income, and thereby increases the probability that the person will state a higher level of life satisfaction outside the unemployment spell. To bring the probability distribution outside the unemployment spell back in line with that of a continuously employed person, the second part of the compensation takes income away from the person at all times he benefits from an increased permanent income. Since the positive income compensation during unemployment and the negative compensation outside of it are both monetary measures, they can be offset against each other to calculate the "net" non-pecuniary costs of unemployment.

The compensation κ_{UE}, which a person has to receive during unemployment in order to fully compensate for the loss in well-being, is given by

$$-\beta_3 = \beta_1 \kappa_{UE} + \beta_2 \frac{\Delta \bar{Y}_i}{\bar{Y}_i}. \tag{6}$$

The left hand side is the life satisfaction loss from unemployment. The first term on the right hand side is the gain in life satisfaction from the compensation through the impact of the transitory income component. The second term depicts the satisfaction effect arising from the change in permanent income induced by the temporary compensation.

Outside the unemployment spell, the positive well-being effect of the increased permanent income has to be countered by a negative compensation κ_E, which brings the level of well-being back to that of a continuously employed person:

$$0 = \beta_1 \kappa_E + \beta_2 \frac{\Delta \bar{Y}_i}{\bar{Y}_i}. \tag{7}$$

The change in permanent income induced by the compensation scheme (κ_{UE}, κ_E) can be approximated by

$$\frac{\Delta \bar{Y}_i}{\bar{Y}_i} = \frac{\tau}{h} \kappa_{UE} + \frac{h - \tau}{h} \kappa_E, \tag{8}$$

where τ denotes the length of the unemployment spell, and h stands for the individual's time horizon during which the increase in permanent income is effective for well-being.[18] The "net" compensation κ is then approximated by[19]

$$\kappa = \kappa_{UE} + \frac{(h-\tau)}{\tau}\kappa_E .\qquad(9)$$

Solving the system of equations (6)-(9) yields:

$$\kappa = \frac{-\beta_3}{\beta_1 + \beta_2} .\qquad(10)$$

The necessary compensation is obtained by dividing the unemployment coefficient by the sum of the coefficients of transitory and permanent income. Intuitively, one can obtain the same result by directly interpreting the coefficients as marginal changes in life satisfaction, and simply adding up the impact of a temporary compensation in the different time periods. If transitory income is raised by κ percent for a time length τ, permanent income rises by $(1/h)\kappa\tau$ percent. Its impact on well-being during unemployment (time length τ) is then given by $\beta_1\kappa + \beta_2(1/h)\kappa\tau$. Since the rise in permanent income raises happiness over the entire horizon, well-being at all other times in life (length $h-\tau$) also increases by $\beta_2(1/h)\kappa\tau$. Adding the two effects, a temporary compensation by κ percent during an interval τ raises lifetime well-being by $(\beta_1 + \beta_2)\kappa\tau$. To balance this with the loss of well-being from unemployment ($-\beta_3\tau$), equation (10) can be used to evaluate the non-pecuniary costs of unemployment under consideration of permanent income effects.[20]

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[18] For the time horizon h, one could assume that a person anticipates the monetary compensation in case of unemployment, so that the increase in permanent income is effective for well-being over the entire lifetime (h equals life expectancy). Alternatively, one could also assume that people realize the increase in permanent income only from the point of time onwards at which they become unemployed and receive the compensation. In this case, the time horizon h comprises the remaining lifetime after entering unemployment. The consumption-relevant permanent income rises as given by (8) because the individual will spread the compensation only over future periods.

[19] Equations (8) and (9) yield exact results, rather than approximations, if the transitory income component is constant over time.

[20] Clark et al. (2001) show that unemployment can cause lower life satisfaction even after one has returned to employment. In the appendix, we show how this "scarring" effect can be incorporated into our monetarization methodology.

3. DATA

The descriptive statistic is based on the German Socio-Economic Panel (GSOEP).[21] We use the period from 1992 to 2006 to include former East German households. We only consider working age individuals between ages 21 and 64. This gives us 163,910 observations. The great advantage of the GSOEP lies in its panel structure, which allows us to follow individuals over several years and thus to calculate a measure of permanent income. For the empirical analysis, we restrict our sample to individuals who have been in the panel for at least ten years. With this restriction, we obtain an unbalanced panel of 92.122 person-year observations.[22] To extract information on individual life satisfaction, the GSOEP questionnaire asks the following question:

"In conclusion, we would like to ask you about your satisfaction with your life in general. Please answer according to the following scale: 0 means 'completely dissatisfied', 10 means 'completely satisfied'. How satisfied are you with your life, all things considered?"

We start with the descriptive statistics of the data. Table 1 shows the distribution of life satisfaction levels for the examined period. The average level of life satisfaction in Germany lies in the upper half of the scale (6.87).

Table 1: Distribution of life satisfaction in Germany (1992-2006)

Life Satisfaction	Share	Observations
0 – completely dissatisfied	0.5	741
1	0.4	675
2	1.3	2,104
3	2.9	4,748
4	3.9	6,474
5	12.8	20,972
6	12.0	19,709
7	23.1	37,911
8	29.4	48,213
9	10.0	16,318
10 - completely satisfied	3.7	6,045
Total	100.0	163,910
Average Life Satisfaction	6.87	

Source: GSOEP, own calculations.

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[21] The data used in this publication were made available by the German Socio-Economic Panel Study (GSOEP) at the German Institute for Economic Research (DIW), Berlin.

[22] Dropping individuals who are observed for less than a certain minimum number of years is necessary to make the calculation of permanent income meaningful. Our results are robust with respect to other cut-offs, e.g. eight or twelve years. Panel attrition is fairly low. For a detailed analysis of the attrition rate and its causes, see Kroh and Spieß (2006).

Only 9.0 percent of all persons report a life satisfaction value in the lower half of the scale (strictly less than 5), whereas 78.2 percent locate themselves in the upper half (6 and above).

Figure 1: Average life satisfaction and unemployment in Germany
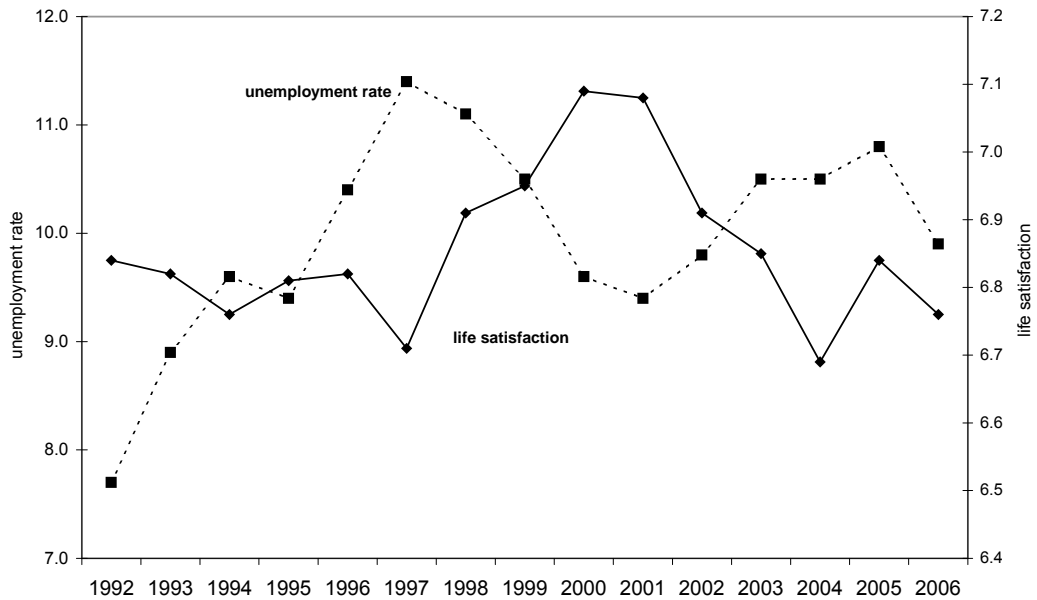
Source: GSOEP, German Federal Labour Office.
Note: The unemployment rate in 2005 and 2006 is adjusted for statistical effects associated with merging different welfare programs.

Figure 2: Life satisfaction according to employment status

Source: GSOEP, own calculations.

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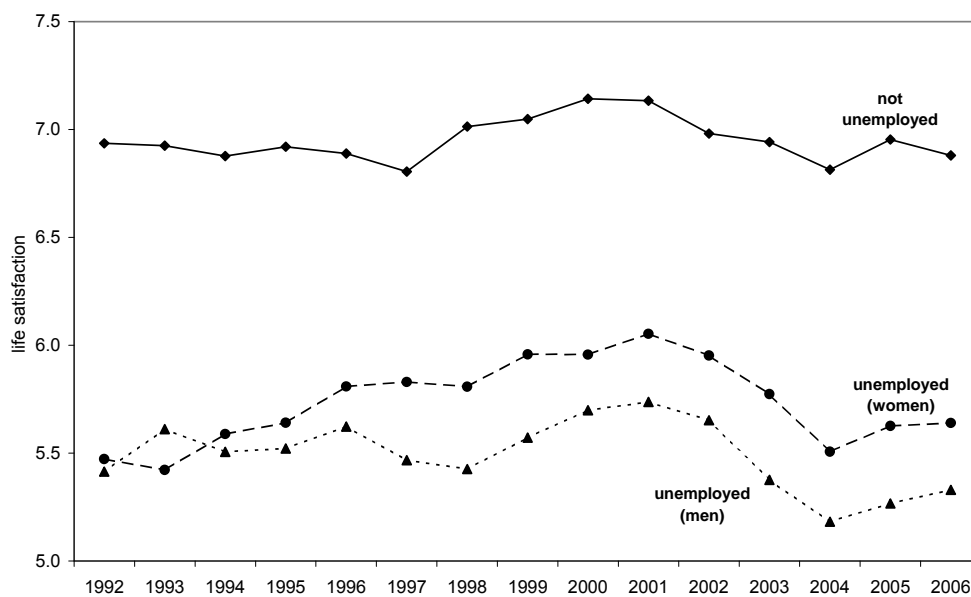
The strong relationship between unemployment and life satisfaction is illustrated by Figure 1. The graphs show that the unemployment rate and average life satisfaction generally move in opposite directions. This suggests that people are happier if labour market conditions are better. Figure 2 complements this finding by looking at individual differences in well-being between employed and unemployed persons.[23] Average life satisfaction of unemployed persons is, on average, two points lower than that of employed individuals. Furthermore, the well-being of women seems to be reduced less by unemployment than men's well-being does.

4. EMPIRICAL RESULTS

The descriptive statistics in the preceding section allow only an overview of the psychological impact of unemployment. To obtain a detailed analysis, one has to apply multiple regression methods to control for various other influential factors.

Table 2 shows the results from an ordered probit estimation for both sexes, men only and women only. Columns 1, 3, and 5 represent the respective results obtained by the standard, truncated specification. Columns 2, 4, and 6 contain the results from our extended model discussed in Section 3.

Employment status

The unemployment coefficient for men and women is negative and significant with a value of -0.566 (both sexes).[24] This is the strongest effect of all explanatory variables and clearly shows the negative impact of unemployment. Happiness levels of short- und long-term unemployed persons are not significantly different.[25] Hence, our results do not contain evidence for habituation to unemployment. Part-time work significantly reduces happiness compared to full-time employment. Self-employed men have a smaller level of life satisfaction than full-time employed men, while this effect is absent for women. An interesting result is provided by public job creation schemes for the unemployed. The happiness effect of taking part in such a scheme is strongly negative compared to being full-time employed. Its coefficient, however, is much weaker than the unemployment coefficient. This means that unemployed persons are happier if they are placed in a public job creation scheme than if they are forced into inactivity. They are, however, much less happy than people (with the same income) in regular employment.

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[23] Figure 2 does not distinguish between the life satisfaction of employed men and women because both are almost identical during the time period examined.

[24] The reference categories are "full-time employment" and family status "single". When interpreting the coefficients, we focus on the results obtained from the extended model.

[25] We controlled for repeated unemployment spells in a separate regression, but did not find significant results.

Table 2: Regression results for life satisfaction

	both sexes		men only		women only	
	(1)	(2)	(3)	(4)	(5)	(6)
	truncated	extended	truncated	extended	truncated	extended
employment status (reference: full-time employed)						
unemployed	-0.567**	-0.566**	-0.642**	-0.644**	-0.493**	-0.489**
	(0.019)	(0.019)	(0.027)	(0.027)	(0.028)	(0.028)
+ long-term unemployed	0.028	0.039	0.002	0.008	0.052	0.064
	(0.025)	(0.025)	(0.036)	(0.036)	(0.034)	(0.034)
part-time	-0.109**	-0.104**	-0.127**	-0.134**	-0.084**	-0.077**
	(0.016)	(0.016)	(0.038)	(0.039)	(0.019)	(0.019)
self-employed	-0.126**	-0.127**	-0.181**	-0.184**	-0.035	-0.019
	(0.023)	(0.023)	(0.030)	(0.030)	(0.036)	(0.037)
public job creation	-0.359**	-0.347**	-0.425**	-0.421**	-0.307**	-0.274**
	(0.045)	(0.044)	(0.066)	(0.065)	(0.061)	(0.061)
other employment	-0.050*	-0.054*	-0.162**	-0.165**	0.024	0.020
	(0.024)	(0.024)	(0.039)	(0.039)	(0.031)	(0.031)
out of labour force	-0.088**	-0.091**	-0.165**	-0.174**	-0.032	-0.038
	(0.016)	(0.015)	(0.025)	(0.026)	(0.021)	(0.021)
income						
ln(transitory income)	0.380**	0.316**	0.393**	0.336**	0.377**	0.300**
	(0.013)	(0.013)	(0.019)	(0.020)	(0.018)	(0.019)
ln(permanent income)		0.520**		0.447**		0.585**
		(0.028)		(0.042)		(0.037)
family status (reference: single)						
living with a partner	0.302**	0.305**	0.274**	0.279**	0.307**	0.304**
	(0.020)	(0.020)	(0.028)	(0.027)	(0.032)	(0.031)
married	0.446**	0.455**	0.456**	0.474**	0.391**	0.397**
	(0.024)	(0.023)	(0.033)	(0.033)	(0.036)	(0.035)
divorced	-0.058	-0.040	-0.159**	-0.130**	-0.017	-0.015
	(0.032)	(0.032)	(0.048)	(0.047)	(0.045)	(0.045)
widowed	-0.064	-0.060	-0.274*	-0.293**	-0.055	-0.053
	(0.046)	(0.046)	(0.112)	(0.101)	(0.057)	(0.057)
other variables						
age	-0.068**	-0.071**	-0.084**	-0.089**	-0.054**	-0.059**
	(0.004)	(0.004)	(0.006)	(0.006)	(0.005)	(0.005)
age^2	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
number of children	0.087**	0.097**	0.095**	0.099**	0.073**	0.087**
	(0.007)	(0.007)	(0.010)	(0.011)	(0.010)	(0.010)
years of education	-0.008**	-0.020**	-0.006	-0.010*	-0.011*	-0.029**
	(0.003)	(0.003)	(0.004)	(0.005)	(0.005)	(0.005)
house ownership	0.097**	0.100**	0.096**	0.102**	0.096**	0.097**
	(0.012)	(0.012)	(0.017)	(0.017)	(0.017)	(0.017)
relative in need of care	-0.232**	-0.209**	-0.251**	-0.220**	-0.227**	-0.214**
	(0.029)	(0.028)	(0.042)	(0.043)	(0.040)	(0.039)
health	0.469**	0.468**	0.482**	0.483**	0.455**	0.455**
	(0.006)	(0.006)	(0.009)	(0.009)	(0.008)	(0.008)
log likelihood	-147,278	-147,122	-70,695	-70,640	-76,455	-76,344
observations	92,122	92,122	44,819	44,819	47,303	47,303

*Note: Ordered probit estimation with individual random effects and time fixed effects. Standard deviations in parentheses. * denotes significance at the 5-percent-level, ** at the 1-percent-level.*

Another important result concerns the life satisfaction of people who do not participate in the labour market (out of labour force). The happiness of non-participants differs only slightly from the life satisfaction of full-time employed persons. It does, however, differ strongly from the life satisfaction of unemployed people. This suggests that unemployment and non-participation are two distinct labour market states, and that unemployment is mainly involuntary.

Looking at the gender-specific results, one notices a difference between men and women in the negative influence of unemployment on life satisfaction. The main insight of Figure 2, that men are more affected by unemployment than women are, is also supported after controlling for various other factors. The impact of part-time employment, public job creation schemes, and non-participation are also more pronounced for men than for women.

To sum up, unemployment has a significantly negative effect on individual life satisfaction whereas men suffer even more from a job loss than women.

Income

The income coefficients have the expected positive sign, i.e. an increase in the transitory as well as in the permanent income component increases an individual's current life satisfaction. The transitory income coefficient is 0.316, that of permanent income 0.520. The effect of the permanent income on current life satisfaction exceeds the influence of the transitory income. Hence, neglecting the effect on permanent income associated with a temporary income compensation would lead to a strong underestimation of the impact of income on well-being. The results support the suspected misspecification of the truncated model. Without controlling for permanent income, the impact of current income is overestimated (0.380) because part of the effect that actually belongs to permanent income is spuriously assigned to current income.

Other variables

Living with a partner as well as being married both have a strong, positive influence on life satisfaction. Previous studies have pointed out the positive effect of marriage (see Clark and Oswald 1994, Diener et al. 2000). Additionally our findings suggest that it is living in a steady relationship what makes people happier. The magnitude of the coefficient is similar for men and women. There is, however, a strong discrepancy for the other family status variables. Divorce and death of a partner have the expected negative signs, but have a much stronger effect on men than on women.

Age affects mental well-being non-monotonically. It reaches its trough at age 46 for men and 51 for women and increases afterwards. Well-being is positively correlated with the

number of children in the household for both sexes.[26] Controlling for income and employment status, it becomes apparent that a person's education only has a small effect on his life satisfaction. House ownership, which is often associated with deeper roots in one's social environment, affects life satisfaction positively. Caring for a relative in the household has the expected negative sign. One's own health, as measured on a scale from 1 (very bad) to 4 (very good), is a very important domain that strongly influences individual life satisfaction.

5. QUANTIFYING THE NON-PECUNIARY COSTS OF UNEMPLOYMENT

To quantify the non-pecuniary costs of unemployment, one calculates the hypothetical income compensation necessary to restore the level of life satisfaction lost due to unemployment.

The standard quantification method based on the truncated model (without distinguishing between transitory and permanent income changes) has been described in equation (5). Comparing the coefficients of unemployment and income yields a required compensation of 0.567 / 0.380 = 149.2 percent to restore the loss in life satisfaction. For men, the required compensation is 163.3 percent, for women 130.8 percent.[27]

As explained in Section 3, these results are distorted due to the misspecification of the truncated model. To use the extended model for quantifying the non-pecuniary costs of unemployment, we revert to the estimation results from Table 2, Columns 2, 4, and 6, and to equation (10).

In the extended model, the required compensation amounts to 67.7 percent of income. This value is considerably lower than the 149.2 percent from the truncated model because the truncated model ignores that a temporary compensation also raises a person's permanent income and causes additional favorable effects outside the unemployment spell. When these additional positive effects are taken into account, a much smaller compensation suffices to counter the satisfaction loss from unemployment. If one analyzes men and women separately, one obtains the same qualitative results. Men need a compensation of 82.2 percent (163.3

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[26] We also ran a separate estimation including a child dummy and an interaction term to account for the possibility that unemployed suffer less if they have children at home. Whereas the child dummy was positive for all individuals as in the estimation above, the interaction term was negative but insignificant. If there is a difference at all, it seems that becoming unemployed causes a stronger drop in the life satisfaction of people with children than of those without.

[27] This standard method has been used by Winkelmann and Winkelmann (1995, 1998) as well as by Blanchflower and Oswald (2004).

percent in the truncated model), and women of 55.3 percent (130.8 percent in the truncated model), for the loss of their job.[28]

Table 3: Non-pecuniary costs of unemployment

	both sexes	men only	women only
truncated model	149.2%	163.3%	130.8%
extended model	67.7%	82.2%	55.3%

Note: The values are expressed relative to individual income.

Table 3 summarizes all the results. The findings show that neglecting permanent income causes a considerable overestimation of the non-pecuniary costs of unemployment. The estimates obtained from the extended model are more than two times their level in the truncated model. Nevertheless, even in the extended model the non-pecuniary costs of unemployment are still very large. Assuming that unemployment is typically associated with an individual income loss of 40 percent of the previous income,[29] the psychological costs of unemployment are twice as large as the pecuniary costs for men, and about one-third larger for women. Hence, as a rule of thumb the total costs of unemployment experienced by men are composed of about two-third non-pecuniary and one-third pecuniary costs. For women, the full individual costs of unemployment are divided almost equally in pecuniary and psychological costs.

6. CONCLUSION

Employment plays a central role in human happiness. It not only allows the satisfaction of material needs through income generation, but also offers immaterial, non-pecuniary benefits for life satisfaction. To quantify these costs, subjective well-being data from social surveys

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[28] Since we model income in a logarithmic form, the marginal impact of absolute income is decreasing. This means that our method yields a compensation that lies in between the so-called "willingness to accept" (WTA) and the "willingness to pay" (WTP). The WTA tells us how much additional income a person would need to receive to keep her life satisfaction at the same level as before becoming unemployed. Formally, this is calculated by $\exp(-\beta_3/\beta_1)-1$ in the truncated model and by $\exp(-\beta_3/(\beta_1+\beta_2))-1$ in the extended model. The WTA in the truncated model is thus 344% (412% for men, 270% for women) and 97% in the extended model (128% for men, 74% for women). The WTP refers to the income share a person is willing to give up to avoid becoming unemployed. The WTP is calculated by $1-\exp(\beta_3/\beta_1)$ in the truncated model and by $1-\exp(\beta_3/(\beta_1+\beta_2))$ in the extended model. In the truncated model, the WTP is 78% (81% for men, 73% for women). In the extended model, the WTP is 49% (56% for men, 43% for women).

[29] This refers to Germany, where the other 60 percent are typically replaced by the unemployment insurance, welfare benefits etc. so that an individual who loses his job experiences a typical pecuniary loss of 40 percent of his previous income (see Winkelmann and Winkelmann, 1998).

can be used to calculate the additional income an individual would require to be compensated for the loss in life satisfaction associated with being unemployed.

The standard method of calculating such income compensations using the life satisfaction approach, however, is flawed because it neglects the intertemporal spillover effects of temporary income compensations. When a person receives additional income, he spreads part of it over his entire lifetime to smooth his consumption path. This consumption smoothing also causes higher life satisfaction outside the time period in which a person's income is actually raised. Since the standard method limits its attention to the period in which unemployment occurs, it ignores the positive effect of the income compensation on life satisfaction in other time periods. Hence, it systematically underestimates income's impact on total life satisfaction and thus overestimates the necessary income compensation for unemployment.

In this paper, we develop a modified monetary equivalence measure for the non-pecuniary costs of unemployment. Following Friedman's (1957) permanent income hypothesis, we distinguish between temporary and permanent income changes, which enables us to capture the intertemporal happiness spillovers of temporary income compensations. This avoids the overestimation bias of the standard method. Our results are more cautious than those derived by previous studies (Winkelmann and Winkelmann 1995, 1998, Blanchflower and Oswald 2004), and reduce the estimated non-pecuniary costs of unemployment by more than one-half. Nevertheless, we find that unemployment drastically reduces life satisfaction even if the income loss would be fully compensated. For men, the non-pecuniary costs of unemployment are about eighty percent of their previous income. For women, the data show substantially lower non-pecuniary cost. For them, the sum of the pecuniary and non-pecuniary cost of unemployment approximates their previous income. Thus, taking the non-pecuniary, psychological costs of unemployment into account shows that the full individual costs of unemployment are up to three times as large as its pecuniary costs only.

The results have clear methodological as well as policy implications. With respect to methodology, our results carry over to quantifying the value of any non-marketable good. For example, the life-satisfaction approach has been applied to determine the value of pollution (Welsch 2002), noise exposure (van Praag and Baarsma 2005), terrorism (Frey et al. 2004), climatic differences (Rehdanz and Maddison 2005), the fear of crime (Moore 2006), and corruption (Welsch 2008). We have shown that the standard method applied in these studies generally overestimates the monetarized value of these goods. To avoid this systematic bias, a

measure of permanent income should always be included to account for the positive intertemporal effects of income compensations.

With respect to policy, even our more cautious method shows that the true costs of unemployment are much higher than suggested by pure individual income losses. Measuring the cost of unemployment only by the income losses of the unemployed significantly underestimates the true cost of unemployment since the non-pecuniary costs are much higher than the pecuniary cost. The generous alimentation through passive labour market policies thus does not suffice to really compensate the unemployed for their job losses. Instead, our results strengthen the case for policies that quickly bring people back into employment.

CHAPTER 3

SCARRING OR SCARING? THE PSYCHOLOGICAL IMPACT OF PAST UNEMPLOYMENT AND FUTURE UNEMPLOYMENT RISK[30]

1. INTRODUCTION

The fear of becoming unemployed in the future is destructive to a person's subjective well-being. Taking into account the devastating impact of the risk of future unemployment, having been unemployed in the past has only a negligible effect on individual life satisfaction. This is the main result of this paper, which provides a more detailed view of the findings of Clark et al. (2001), who show that unemployment experienced in the past makes an individual less satisfied with his current life situation even if he has become reemployed in the meantime. Clark et al. (2001) label this the "scarring" effect of unemployment: past unemployment leaves a permanent scar on one's face, it inflicts permanent damage on the human psyche that leads to lower life satisfaction independently of a person's current labour market status. In this paper, we will provide an explanation why this scarring effect arises. We argue that past unemployment influences current well-being mainly indirectly because people use the information on how often they have been unemployed in the past as an indicator of their future labour market success. If a person infers from more frequent unemployment episodes in the past that he is also more likely to be unemployed in the future, the drop in life satisfaction correlated with past unemployment will, to a large extent, be caused by the fear of future unemployment. Past unemployment leaves a "scar" because it "scares" the individual about the future.

While Clark et al. (2001) show that past unemployment is negatively correlated with current life satisfaction, they use the term scarring descriptively, leaving open the question of why this phenomenon occurs. To fill this gap, we extend the study by Clark et al. (2001) by including different measures of the likelihood of future unemployment in our regression analysis. Estimating the simultaneous impact of past unemployment experiences and the fear of future unemployment and comparing the both effects allows us to conduct a kind of beauty

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[30] This chapter was written in collaboration with Andreas Knabe. See Knabe, A. and S. Rätzel (2009). "Scarring or Scaring? The psychological impact of past unemployment and future unemployment risk.", forthcoming in *Economica.*

contest between two interpretations of the scarring effect. Our first interpretation is that past unemployment is genuinely scarring. In this case, it would reduce current life satisfaction independently of its impact on future expectations. To support this interpretation, we would need to find that past unemployment has a negative impact on current life satisfaction, even if we held a person's expectations about future unemployment constant. Our second interpretation is that past unemployment works through scaring a person about the future. According to this view, we should find that the fear of future unemployment reduces current well-being, holding the time a person has been unemployed in the past constant. While both effects could potentially be present at the same time, our analysis supports the scaring effect: the fear of future unemployment is detrimental to current well-being. The inclusion of future expectations as a separate predictor of life satisfaction substantially weakens the genuine scarring hypothesis. Once we control for insecurity about future employment prospects, past unemployment loses much of its explanatory power for current life satisfaction.

The paper is structured as follows. In the next section, we present our data and our estimation methodology. Section 2 contains our empirical results. The last section provides a summary and concludes.

2. DATA AND ECONOMETRIC FRAMEWORK

Our empirical analysis is based on the German Socio-Economic Panel (GSOEP).[31] We make use of the first 22 waves for the period from 1984 to 2005 and consider all German nationals of working age between 25 and 55.[32] This yields an unbalanced panel with about 120,000 person-year observations.[33]

Our data on subjective well-being stem from a question in the GSOEP that asks respondents: "How satisfied are you with your life, all things considered?" The question had to be answered on an ordinal scale from 0 (completely dissatisfied) to 10 (completely satisfied).

As our benchmark, we reproduce the estimation specification by Clark et al. (2001). Under this approach, contemporary life satisfaction is explained by a set of personal characteristics, a

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[31] The data used in this publication were made available by the German Socio-Economic Panel Study (GSOEP) at the German Institute for Economic Research (DIW), Berlin. The data were extracted using the Add-On-package PanelWhiz for Stata, see Haisken-DeNew and Hahn (2006) for details.
[32] This sample restriction follows Clark et al. 2001. The inclusion of foreigners, however, does not affect the results.
[33] The sample restrictions are the same as in Clark et al. (2001). The only difference concerns the separate treatment of the individuals that are out of the labour force and those active in the labour force in the estimation specification. This is necessary because the out of the labour force group do not provide information about their future employment prospects and thus only serve as control variables in our estimation.

person's current employment status, and his unemployment history. We estimate the empirical well-being function:

$$
\begin{aligned}
LS_{it} = \beta_0 &+ \beta_1 UN_{it} + \beta_2\left(E_{it} \times PASTUN_{it}\right) + \beta_3\left(UN_{it} \times PASTUN_{it}\right) \\
&+ X'_{it}\gamma + \nu_i + \mu_t + \varepsilon_{it}
\end{aligned}
\tag{1}
$$

where LS_{it} is the life satisfaction reported by individual i at time t. UN_{it} takes on the value 1 if individual i is registered unemployed at time t, and 0 otherwise. In the same way, E_{it} indicates that a person is employed. $PASTUN_{it}$ is a measure of past unemployment. Following Clark et al. (2001), we define $PASTUN_{it}$ by the time spent in unemployment as a percentage of total time active in the labour force during the preceding three years. Our specification differs from that of Clark et al. (2001) only in that we have two separate interaction effects of past unemployment, ($E_{it}*PASTUN_{it}$) for the employed and ($UN_{it}*PASTUN_{it}$) for the unemployed, while Clark et al. (2001) had a main term for past unemployment for everyone, ($PASTUN_{it}$), and then an interaction term, ($UN_{it}*PASTUN_{it}$). While this affects the interpretation of the interaction terms, it represents the same projection in the data space and does not affect any of the results.[34] The vector X_{it} is a set of explanatory variables that can potentially influence the well-being of the individual (such as income, marital status, etc.). ν_i is an individual fixed effect that captures unobserved time-invariant differences between individuals (personal traits), μ_t denotes unobserved time-varying circumstances in a specific year that affect all individuals equally, and ε_{it} is a random error term.

We compare this benchmark with an extended model in which we take indicators of the fear of future unemployment into account. We extend the estimation equation (1) by including measures of a person's subjective expectation about the likelihood of future unemployment:

$$
\begin{aligned}
LS_{it} = \beta_0 &+ \beta_1 UN_{it} + \beta_2\left(E_{it} \times PASTUN_{it}\right) + \beta_3\left(UN_{it} \times PASTUN_{it}\right) \\
&+ \beta_4\left(E_{it} \times EMPLOYSECURITY_{it}\right) + \beta_5\left(UN_{it} \times EMPLOYCHANCE_{it}\right) . \\
&+ X'_{it}\gamma + \nu_i + \mu_t + \varepsilon_{it}
\end{aligned}
\tag{2}
$$

$EMPLOYSECURITY_{it}$ indicates whether an employed person considers his current job as secure or not. We construct this variable from the answers to the question: "How concerned are you about your job security?" Respondents had three answer options: "very concerned", "somewhat concerned", or "not concerned at all". The variable $EMPLOYCHANCE_{it}$ is the

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[34] In the GSOEP, employed and unemployed persons are not asked the same question about their future prospects. In the following analysis, we thus cannot group the impact of future insecurity on the employed and the unemployed into a common effect and a differential effect. Instead, we have to estimate separate interaction effects. For expositional consistency, we apply the same distinction for the effect of past unemployment as well.

counterpart for the unemployed. Respondents were asked "If you are/were currently looking for a new job: Is it or would it be easy, difficult or almost impossible to find an appropriate position?", where the answer options were "easy", "difficult" or "almost impossible".[35]

The amount of time a person has been unemployed in the past is correlated with this person's perception of future unemployment risk. This correlation is illustrated in Table 1. Among all employed persons who have been unemployed for less than one third of the previous three years, 46.0 percent feel that they have high job security ("not concerned"). Only 13.6 percent think that their job security is low ("very concerned"). Employed persons with more past unemployment experience deem their jobs riskier. Among currently employed persons who have been unemployed for more than two-thirds of the previous three years, only 26.8 percent are not concerned about their job security, while 32.8 percent are very concerned. A similar picture emerges for the unemployed. The share of unemployed who think that it is easy for them to find a new job drops from 9.1 percent for those with unemployment of less than one-third of the previous three years to only 1.5 percent for past unemployment more than two-thirds of the previous three years.

Table 1: Past unemployment and perceptions of future unemployment risk

	$0 \leq PASTUN_{it} \leq \frac{1}{3}$	$\frac{1}{3} < PASTUN_{it} \leq \frac{2}{3}$	$\frac{2}{3} < PASTUN_{it} \leq 1$
employed			
high job security	46.0%	27.3%	26.8%
medium job security	40.4%	44.6%	40.4%
low job security	13.6%	28.1%	32.8%
observations in column	98,897	2,340	772
Pearson's Chi^2	778.02 ($p < 0.001$)		
unemployed			
easy to find a job	9.1%	3.7%	1.5%
hard to find a job	74.9%	70.4%	58.6%
almost impossible to find a job	16.0%	25.9%	39.9%
observations in column	3,688	2,293	3,483
Pearson's Chi^2	671.47 ($p < 0.001$)		

Note: The figures are column percentages.

The share of unemployed who find it almost impossible to find a new job rises from 16.0 percent to 39.9 percent when comparing the unemployed with little experience of past

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[35] For the actual estimation in the next section, we construct separate dummy variables for the three respective categories.

unemployment with those who have experienced unemployment for most of the previous years. These numbers clearly illustrate that past unemployment is an indicator of a person's subjective perception of future unemployment risk.

Clark et al. (2001) estimate the total effect of past unemployment on life satisfaction without distinguishing between the direct effect of past unemployment and its indirect effect through its negative impact on future unemployment risk. We can operationalize these two effects by writing the life satisfaction function as

$$LS(X, PASTUN, PROSPECTS(Y, PASTUN)).$$

X and Y are vectors of various determinants of life satisfaction and future prospects. $PASTUN$ has a direct effect on life satisfaction LS and an indirect effect via future prospects. The total impact of past unemployment on life satisfaction is then determined by

$$\frac{dLS}{dPASTUN} = \underbrace{\frac{\partial LS}{\partial PASTUN}}_{\substack{\text{direct effect} \\ \text{(genuine scarring)}}} + \underbrace{\frac{\partial LS}{\partial PROSPECTS}\frac{\partial PROSPECTS}{\partial PASTUN}}_{\substack{\text{indirect effect} \\ \text{(scaring)}}}.$$

The total effect of past unemployment is empirically determined by estimating function (1), which corresponds to implicitly imposing $\beta_4 = \beta_5 = 0$ in specification (2). Clark et al. (2001) find that current unemployment leads to lower life satisfaction ($\beta_1 < 0$), past unemployment reduces current well-being for those who are currently in employment ($\beta_2 < 0$), and that past unemployment has a smaller negative effect on currently unemployed than on currently employed persons ($\beta_2 < \beta_3$). This last finding can also be interpreted as a "habituation" effect because it implies that becoming unemployed hurts less if one has already experienced more unemployment in the past.

In our estimations, we do not impose any restrictions on β_4 and β_5 in specification (2) and are thus able to distinguish between the effects of past unemployment and future unemployment risk on current well-being. This allows us to test whether past unemployment has a direct impact on current well-being or whether the negative effect is indirectly caused by the fear of future unemployment. Thus, our two hypotheses are:

Genuine Scarring: Past unemployment scars directly. It reduces current well-being both for currently unemployed persons ($\beta_3 < 0$) and also for persons who have become reemployed in the meantime ($\beta_2 < 0$), holding a person's future employment prospects constant.

Scaring: The prospect of being unemployed in the future is frightening and reduces current well-being both for those currently employed ($\beta_4 < 0$) and unemployed ($\beta_5 < 0$).

Life satisfaction is measured as an ordinal categorical variable. To take the ordinal nature of the life satisfaction variable into account, we first estimate our model using the ordered probit model. In a second step, we apply the fixed-effect ordered logit estimator developed by Ferrer-i-Carbonell and Frijters (2004) to control for time-invariant personal traits.[36] We choose the fixed effect model because recent findings indicate that time-invariant individual traits exert a strong influence on life satisfaction. For example, Lykken and Tellegen (1996) find evidence that up to 80 percent of the interpersonal variation in well-being is influenced by individual genes and personal traits. More recently, Ferrer-i-Carbonell and Frijters (2004) show that taking account of individual-specific effects is essential in explaining happiness (even more than distinguishing between cardinality and interpersonal ordinality of the satisfaction answers).

3. ESTIMATION RESULTS

The results of our ordered probit estimation are presented in Table 2.[37] The results shown in Columns 1 and 2 refer to a specification without any intertemporal effects (setting $\beta_2 = \beta_3 = 0$ in equation (1)). This is the standard approach taken by most studies on the well-being effect of unemployment that restrict their attention to how variables at time t influence well-being at time t.[38] Our results are in line with these studies, which provide overwhelming evidence that becoming unemployed reduces individual life satisfaction by much more than what can be explained by the associated income loss. Even if one could entirely compensate a person for the loss in income caused by unemployment, so that the person could, in principle, enjoy more leisure without reducing consumption, the person would nevertheless suffer from lower life satisfaction. "Work" not only serves the purpose of earning a living, but also has

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[36] We follow Clark et al. (2001) in conducting a pooled ordered probit regression before the fixed-effects logit estimation. Clark et al. (2001), however, use the fixed effect logit estimator developed by Chamberlain (1980), which transforms the categorical *LS*-scale into a binary variable by imposing one and the same cut-off level on all individuals. This method has the disadvantage of losing all observations of individuals who always report *LS*-levels above or below this cut-off. The fixed effect logit estimator of Ferrer-i-Carbonell and Frijters (2004) avoids this shortcoming by imposing individual-specific cut-offs.

[37] We abstain from presenting summary statistics of the happiness scores and do not explicitly report the coefficients of our control variables because the results are in line with previous studies (see Frey and Stutzer (2002), Blanchflower and Oswald (2004), or Frijters et al. (2004)).

[38] There are numerous studies showing that contemporaneous unemployment has a strong, negative effect on subjective well-being, see, for example, Clark and Oswald (1994), Gerlach and Stephan (1996), Winkelmann and Winkelmann (1998), Korpi (1997), Frey and Stutzer (2000, 2002), Clark (2003, 2006).

additional, non-pecuniary benefits. In line with Clark et al. (2001), self-employment reduces the life satisfaction of men and women. The income coefficient is positive and highly significant: more income increases life satisfaction of men and women.

Table 2: Regression results (Ordered Probit)

	Without intertemporal effects		Only past variables		With past variables and future expectations	
	(1)	(2)	(3)	(4)	(5)	(6)
	Men	Women	Men	Women	Men	Women
Dependent variable	Life satisfaction	Life satisfaction	Life satisfaction	Life satisfaction	Life satisfaction	Life satisfaction
Employed						
full-time	reference	reference	reference	reference	reference	reference
part-time	-0.171***	0.100***	-0.138***	0.098***	-0.181***	0.041***
	(0.029)	(0.011)	(0.035)	(0.013)	(0.035)	(0.013)
self-employed	-0.175***	0.029	-0.207***	0.025	-0.208***	-0.027
	(0.015)	(0.020)	(0.018)	(0.024)	(0.018)	(0.024)
past unemployment			-0.708***	-0.443***	-0.486***	-0.307***
			(0.059)	(0.049)	(0.059)	(0.050)
high job security					reference	reference
medium job security					-0.355***	-0.315***
					(0.011)	(0.013)
low job security					-0.751***	-0.594***
					(0.017)	(0.019)
Unemployed	-0.851***	-0.589***	-0.750***	-0.526***	-0.410***	-0.078
	(0.017)	(0.017)	(0.032)	(0.034)	(0.079)	(0.102)
past unemployment			-0.343***	-0.078	-0.197***	-0.033
			(0.056)	(0.051)	(0.060)	(0.052)
easy to find new job					reference	reference
difficult to find new job					-0.704***	-0.702***
					(0.082)	(0.103)
almost impossible to find new job					-0.984***	-0.895***
					(0.091)	(0.107)
Income (CPI adjusted total net household income divided by number of household members)						
income/1000	0.215***	0.289***	0.111***	0.197***	0.076***	0.171***
	(0.009)	(0.009)	(0.014)	(0.016)	(0.014)	(0.016)
past income/1000			0.108***	0.119***	0.086***	0.081***
			(0.016)	(0.018)	(0.016)	(0.018)
personal controls	yes	yes	yes	yes	yes	yes
individual fixed effects	no	no	no	no	no	no
time fixed effects (annual)	yes	yes	yes	yes	yes	yes
log likelihood	-114,374	-114,562	-79,996	-81,360	-78,793	-80,626
observations	62,939	62,034	44,439	44,349	44,439	44,349

Note: Ordered probit estimation with time fixed effects. Personal controls include marital status, children, years of education, out of labour force, an interaction term between past unemployment and out of labour force, 5-year age brackets, living in owned accommodation, household member in need of care. Standard errors in parentheses. * denotes significance at the 10-percent-level, ** at the 5-percent-level, *** at the 1-percent-level.

Columns 3 and 4 present the results obtained by estimating the benchmark specification (1). We integrate separate measures of past unemployment of the employed and the unemployed as well as a measure of past income (average income over the previous three years). Our results reproduce the main findings of Clark et al. (2001), even with our larger dataset. Currently unemployed individuals are worse off than those in full-time employment. Past unemployment significantly reduces the life satisfaction of all groups (except for unemployed women). The effect is larger for the employed than for the unemployed, so that switching from employment to unemployment hurts less if a person has already been unemployed more often in the past. This can be seen by calculating the difference between the life satisfaction of employed and unemployed persons with the same amount of past unemployment. The life satisfaction of an employed man who had been unemployed for x percent of the previous three years is lower by $-0.71x$ than the life satisfaction of an employed men without any past unemployment experience.[39] An unemployed man has a lower life satisfaction than an employed man given by the coefficient -0.75, but past unemployment of x percent affects his satisfaction only by $-0.34x$. The difference between the life satisfaction of an employed man and an unemployed man with past unemployment experience of x percent is then given by $-0.71x - (-0.75 - 0.34x) = 0.75 - 0.37x$. This shows that the loss in life satisfaction from unemployment is smaller if the fraction of time spent unemployed in the past is larger. Hence, the benchmark model produces supportive evidence both for the scarring effect and for habituation to unemployment.[40]

We now want to test whether this negative impact of past unemployment persists once we control for the fear of future unemployment. The main results of estimating specification (2) are shown in Columns 5 and 6 of Table 2. We find clear evidence that the fear of future unemployment substantially reduces current life satisfaction for both men and women. If a person is currently employed, but has the feeling that her job security is only medium ("somewhat concerned") or low ("very concerned"), her happiness falls far below what it would be if she did not have to worry about her job security. If a person is currently unemployed and deems it difficult or almost impossible to find a suitable job, she experiences a much larger drop in life satisfaction than if it was easy for her to find reemployment. The size of the different expectation coefficients is remarkable. Bad future employment prospects

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[39] It should be kept in mind that the magnitude of the coefficients of an ordered probit estimation are not to be interpreted as marginal effects directly, but that they shift the probability mass around between the cut-offs of a normal distribution.

[40] Since past unemployment refers to the number of months spent in unemployment, independently of the number of distinct unemployment spells, our results suggest that a person becomes habituated to the general state of unemployment rather than to a particular unemployment spell.

exert a substantial negative influence on well-being for men and women. These findings strongly support the hypothesis that future unemployment is scaring.

With respect to unemployment experienced in the past, Table 2 shows that the ordered probit estimation also finds evidence for a scarring effect, although the coefficients are smaller (in absolute values) than in the specification without future effects. Even if one holds a person's assessment of her future employment prospects constant, having experienced more unemployment in the past still turns out to be detrimental to subjective well-being. The impact of past unemployment, however, is overestimated in the benchmark model because people interpret longer unemployment spells in the past as an indicator of a higher risk of becoming unemployed in the future (past unemployment and the subjective assessment of bad future prospects are positively correlated). Since people are afraid of future unemployment, omitting future prospects from the estimation causes an overestimation of the coefficients on past unemployment in specification (1). To sum up, the ordered probit model shows that both the experience of past unemployment and the fear of becoming (or remaining) unemployed in the future have a negative impact on current well-being.

A drawback of the ordered probit model is that it does not allow us to control for time-invariant personality traits. This raises doubts about the causality of the relationship between unemployment and unhappiness. If it were the case that inherently unhappy people tend to become unemployed more often, or have a tendency to be more pessimistic about their future, one would observe that (past) unemployment and bad future prospects are correlated with less happiness, but their relation would be simultaneous instead of causal. To correct for such causality problems, it has become common practice in the happiness literature to apply a fixed effects model that effectively uses only data about changes in the life circumstances of the same individual instead of comparing different persons with each other. By using fixed effects, one can thus control for personal predispositions in life satisfaction.[41]

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[41] Even though the fixed effects model controls for time-invariant personality traits, we cannot rule out an alternative explanation to the scaring hypothesis. It might be that past unemployment reduces a person's current life satisfaction and his general level of optimism at the same time because both could be two different manifestations of the same underlying emotional state. In this case, the correlation between less optimistic outlooks on the future and currently lower happiness would not be causal but only simultaneous. Our data do not allow us to test directly how the causality runs. The available evidence, however, points to a causal relationship going from past unemployment to an increased fear of becoming unemployed in the future to lower well-being. Arulampalam et al. (2001) were able to show that an individual's past history of unemployment is the best predictor of his future risk of unemployment. The psychological literature has also established that job insecurity causes lower well-being (see de Witte 1999 for a survey). Taken together, it seems plausible that the relationship is causal rather than just simultaneous.

Table 3: Regression results (Fixed Effects Logit)

Dependent variable	Without intertemporal effects		Only past variables		With past variables and future expectations	
	(1) Men	(2) Women	(3) Men	(4) Women	(5) Men	(6) Women
	Life satisfaction	Life satisfaction	Life satisfaction	Life satisfaction	Life satisfaction	Life satisfaction
Employed						
full-time	reference	reference	reference	reference	reference	reference
part-time	-0.336***	-0.156***	-0.277***	-0.158***	-0.306***	-0.182***
	(0.083)	(0.037)	(0.104)	(0.046)	(0.105)	(0.046)
self-employed	-0.260***	-0.018	-0.340***	-0.051	-0.338***	-0.065
	(0.062)	(0.070)	(0.078)	(0.086)	(0.078)	(0.087)
past unemployment			-0.214	0.380***	-0.115	0.438***
			(0.165)	(0.137)	(0.167)	(0.138)
high job security					reference	reference
medium job security					-0.421***	-0.311***
					(0.032)	(0.035)
low job security					-0.931***	-0.615***
					(0.049)	(0.054)
Unemployed	-1.076***	-0.851***	-1.123***	-0.794***	-0.510***	-0.047
	(0.051)	(0.050)	(0.087)	(0.088)	(0.188)	(0.249)
past unemployment			-0.401**	0.047	-0.164	0.066
			(0.178)	(0.144)	(0.186)	(0.146)
easy to find new job					reference	reference
difficult to find new job					-1.163***	-1.041***
					(0.193)	(0.249)
almost impossible to find new job					-1.557***	-1.179***
					(0.224)	(0.261)
Income (CPI adjusted total net household income divided by number of household members)						
income/1000	0.350***	0.280***	0.263***	0.235***	0.236***	0.221***
	(0.031)	(0.033)	(0.039)	(0.043)	(0.039)	(0.044)
past income/1000			0.260***	0.147***	0.261***	0.131**
			(0.049)	(0.056)	(0.050)	(0.056)
personal controls	yes	yes	yes	yes	yes	yes
individual fixed effects	yes	yes	yes	yes	yes	yes
time fixed effects (annual)	yes	yes	yes	yes	yes	yes
log likelihood	-26,905	-26,617	-17,981	-18,199	-17,753	-18,105
observations	58,231	57,450	39,609	39,850	39,609	39,850

*Note: Fixed-effects ordered logit estimation with individual and time fixed effects. Personal controls include marital status, children, years of education, out of labour force, an interaction term between past unemployment and out of labour force, 5-year age brackets, living in owned accommodation, household member in need of care. Standard errors in parentheses. * denotes significance at the 10-percent-level, ** at the 5-percent-level, *** at the 1-percent-level.*

Table 3 contains the results from a fixed-effect conditional logit estimation (Ferrer-i-Carbonell and Frijters (2004)). In columns (1) and (2), we present the estimation without past unemployment effects. The results are similar to the ordered probit estimation in Table 2. Being unemployed reduces well-being both for men and for women. Compared to full-time employment, both men and women suffer from being employed part-time or self-employed. Income raises the life satisfaction of both sexes. In columns (3) and (4), we add past unemployment and past income as explanatory variables. Even with fixed effects, past unemployment maintains its negative impact on the life satisfaction of currently employed and unemployed men. For unemployed women, however, it is insignificant, and it even becomes positive for employed women.[42]

Adding expectations about the future changes these results significantly (columns (5) and (6)). As in the ordered probit estimation, taking future unemployment risk into account captures a large proportion of the negative well-being effect previously assigned to past unemployment. The coefficients on past unemployment weaken so much that we do not find evidence for a scarring effect for employed and unemployed men anymore. Unfavourable expectations about the future, however, maintain their strong impact on life satisfaction even when we control for fixed effects. This holds for the employed as well as for the unemployed. Employed persons with more job security are significantly happier than if they were employed in riskier jobs, and the unemployed are much happier if they expect finding a new job to be easy compared to situations where they see more difficulties in becoming reemployed. Even if we control for time-invariant personality traits, we find overwhelming evidence for a scaring effect of future unemployment.

It is also an illuminating exercise to compare the relative size of the estimates. High insecurity about future (un)employment is one of the most harmful conditions for individual well-being. On the other hand, current unemployment in itself matters much less than suggested by previous studies if the unemployed person considers it easy to find a new job. For women, we find that the state of unemployment does not even reduce well-being significantly as long as their future expectations concerning their employment chances are good. Furthermore, our results indicate that, *ceteris paribus*, an employed individual with a high risk of losing his job is less satisfied with his life than an unemployed person who can find a new job easily. This finding puts the negative life satisfaction effects of unemployment

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[42] A possible explanation for this positive effect (that becomes apparent only after controlling for the sorting effect by considering individual fixed effects, c.f. Table 2) could be that finding a job after having been unemployed for some time is a surprising, favorable occasion and thus gives a larger boost to life satisfaction. An explicit analysis of this adaptation process is, however, beyond the scope of this paper.

typically found in previous studies into perspective and points to the strong influence of individual expectations about one's future employment biography.

To sum up, our results suggest that the evidence for a genuine scarring effect, which postulates that past unemployment has a direct effect on current well-being, is substantially weakened by taking into account a person's future employment prospects and by allowing for fixed personality traits. We find overwhelming evidence, however, that employed persons suffer from a much lower level of life satisfaction if they feel that their job is insecure and that they might become unemployed in the near future. Likewise, persons without a job feel much happier if it is easy for them to find a new job so that they expect to become reemployed rather quickly. It is not so much that a person has experienced unemployment in the past that causes a loss in life satisfaction, but that unemployment might occur (again) in the future.

4. CONCLUSION

Our starting point is the "scarring" hypothesis of Clark et al. (2001), according to which people who were unemployed in the past are less happy than continuously employed persons even after they return to employment. In their terminology, unemployment leaves a scar on a person's face. Our results suggest that the scarring effect of Clark et al. (2001) works mainly through its impact on how people judge their own future. People interpret their own past unemployment as an indicator of their future labour market prospects. If they have experienced more unemployment in the past, they are more afraid that this might happen to them again. This insecurity about the future is detrimental to life satisfaction. Our findings suggest that it is the fear of future unemployment rather than having experienced unemployment in the past that makes people feel less happy.

Using data from the German Socio-Economic Panel for the years 1984 to 2005, we modify the analysis of Clark et al. (2001) by distinguishing between the impact of past unemployment and insecurity about future employment prospects on current life satisfaction. Our results show that, once we control for future insecurity and time-invariant personality traits, the amount of time a person was unemployed in the past loses much of its explanatory power for current well-being. We find only weak evidence that past unemployment has a direct negative effect on the well-being of both currently employed and currently unemployed persons. We do find, however, that the prospect of being unemployed in the future is highly detrimental to current life satisfaction. Low job security for the employed and unfavourable reemployment chances of the unemployed are harmful to subjective well-being even after controlling for individual-specific fixed effects.

Our results show that the scarring effect of past unemployment can be explained best through its effect on people's fear of future unemployment. It is this fear, rather than any direct effects of past unemployment, that makes people unhappy. The label for the intertemporal effects of unemployment should thus be changed by one letter: past unemployment "scars" because it "scares".

CHAPTER 4

UNEMPLOYMENT AS A SOCIAL NORM IN GERMANY[43]

1. INTRODUCTION

Unemployment is amongst the most harmful of all experiences for individual well-being. During the Great Depression, Eisenberg and Lazarsfeld (1938), using descriptive methods, emphasised that job loss deprived individuals not only of their labour income, but also of the non-pecuniary benefits of work. The more recent economic literature on subjective well-being has also addressed this issue. Clark and Oswald (1994), using the first wave of the British Household Panel Survey (BHPS), showed that unemployment is associated with significantly lower mental well-being (GHQ) scores. Additional supportive evidence has come from other countries, for example Germany in Gerlach and Stephan (1996) and Winkelmann and Winkelmann (1995, 1998), and the United States in Blanchflower and Oswald (2004). All these studies show that unemployment reduces subjective well-being by more than what can be explained by the associated income loss.

Besides having adverse effects on the mental well-being of those who actually lose their jobs, unemployment also affects the well-being of individuals in the community of the unemployed, such as their families, colleagues, and neighbors. In particular, higher unemployment may reduce the well-being of those who remain in work via a more pessimistic perception of their own future unemployment prospects. Cobb and Kasl (1977), Fryer and McKenna (1988), and De Witte (1999) have all emphasized that the anticipation of redundancy is at least as distressing for individuals as the experience of unemployment itself. Hartley *et al*. (1991), in their survey of a number of pieces of work on job insecurity, found that those with falling perceived job security also report severe uncertainty in other life areas, impaired mental health (as expressed by psychosomatic symptoms and depression), lower job satisfaction, reduced organizational commitment and trust in management, resistance to change and deteriorating industrial relations.

While there would appear to be a fair amount of evidence of the detrimental effect of surrounding unemployment on the employed, this is less true for the effect of local

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[43] This chapter was written in collaboration with Andrew E. Clark and Andreas Knabe. See Clark, A. E., Knabe, A. and S. Rätzel (2009). "Unemployment as a Social Norm in Germany.", *Journal of Applied Social Science Studies* 29, 251-260.

unemployment on the unemployed themselves. It has been suggested in the literature that unemployment may hurt the unemployed less the more they see of it around them, as the stigma from their own unemployment is then reduced. For example, Kessler *et al.* (1988) find that it is easier for the unemployed to establish social contacts when others in the local area are also unemployed. Cohn (1978) finds that unemployed persons' satisfaction with self is lower when there is no external cause to which one's own unemployment can be attributed, but that generally high unemployment in the region can represent such an external cause.

Economists have recently started to make use of large-scale datasets to quantitatively examine the effect of unemployment on others. Clark (2003) uses the BHPS to examine the impact of other's unemployment both on the employed and on the unemployed. While regional unemployment generally has a negative effect on the employed, there is evidence of an opposite effect for unemployed men: the well-being of unemployed men rises with the regional unemployment rate. Even at the household and partner level, men report higher well-being scores if they are not the only unemployed person in the household. These results are consistent with a "social norm" effect of unemployment. Similar results have been found for the United Kingdom (Shields and Wheatley Price, 2005), Australia (Shields *et al.*, 2009), South Africa (Powdthavee, 2007), and Switzerland (Stutzer and Lalive, 2004).

In this paper, we follow the methodology of Clark (2003) and, using data for Germany, examine how the subjective well-being of the employed and the unemployed is affected by regional unemployment rates. We find strong evidence for a social norm effect of unemployment in Germany. While employed men suffer from unemployment in their region, unemployed men are significantly less negatively affected. For women, however, no such offsetting effect appears to exist.

This paper is structured as follows. In the next section, we describe the data and the estimation methodology. Section 3 contains the empirical results, and the last section provides a summary and concludes.

2. DATA AND METHODOLOGY

We use data from 23 waves (1984-2006) of the German Socio-Economic Panel (GSOEP), a representative longitudinal study of private households in Germany.[44] We include all individuals aged between 21 and 60 who are either employed or registered unemployed. This yields roughly 60,000 observations (from 9,000 different individuals) for each sex. As a proxy

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[44] The data used in this publication were made available by the German Socio-Economic Panel Study (GSOEP) at the German Institute for Economic Research (DIW), Berlin. The data were extracted using the Add-On-package PanelWhiz for Stata: see Haisken-DeNew and Hahn (2006) for details.

utility measure, we use self-rated life satisfaction, measured on a scale from 0 to 10 (where 0 denotes "not satisfied at all" and 10 stands for "completely satisfied").

We explain life satisfaction by a fairly standard set of variables, such as income, family status, education etc. To examine the personal and external effects of unemployment, we also include the respondent's own employment status and the regional unemployment rate. To test for a social norm effect, we include an interaction term between own employment status and the regional unemployment rate. Our multivariate analysis is based on the same regression specification as Clark (2003, p. 332):

$$LS_{it} = \alpha_i + \beta_1 UE_{it} + \beta_2 UERATE_{it} + \beta_3 \left(UE_{it} * UERATE_{it} \right) + \gamma' X_{it} + \mu_t + \varepsilon_{it} \qquad (1)$$

where α_i is an individual fixed effect, UE_{it} is a dummy taking the value 1 if the individual is officially registered as unemployed at the German Employment Office, and $UERATE_{it}$ is a measure of the regional unemployment rate (at the German federal state level).[45] The vector X_{it} is a set of standard control variables that might potentially be correlated with individual well-being (such as income and marital status), μ_t are wave dummies, and ε_{it} is a random error term.

Building on the social norm literature cited in the Introduction, we formulate three prior hypotheses regarding equation (1): $\beta_1 < 0$ (the unemployed are less happy than the employed); $\beta_2 < 0$ (higher regional unemployment makes the employed less happy); and $\beta_3 > 0$ (there is a counteracting social norm effect for the unemployed, who are thus less negatively affected by regional unemployment than are the employed).

3. RESULTS

3.1 Descriptive Statistics

A simple and illustrative way of demonstrating a social norm effect of unemployment is to compare the life satisfaction gap between the employed and the unemployed in regions with different unemployment rates and check whether this life satisfaction gap is smaller in higher unemployment regions. Figures 1 and 2 illustrate, for men and women respectively, the relationship between regional unemployment and the life satisfaction gap between the employed and the unemployed. Each point in these figures represents a German federal state, averaged over five-year periods from 1984 to 2006.

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[45] These unemployment rates were obtained from the German Employment Office (2008).

Figure 1: The employed-unemployed life satisfaction gap and regional unemployment: men
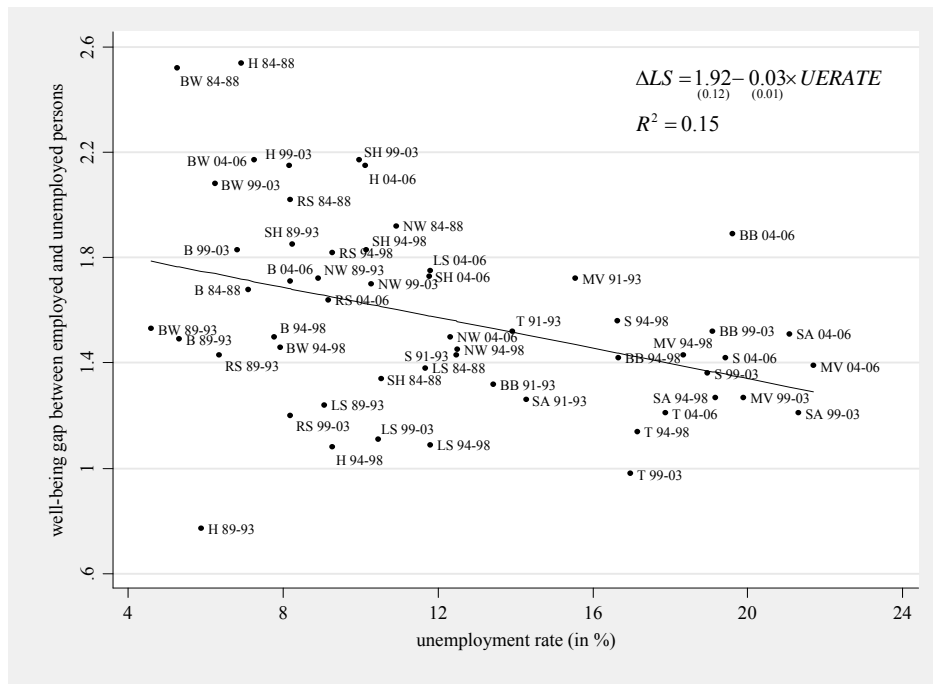
Figure 2: The employed-unemployed life satisfaction gap and regional unemployment: women
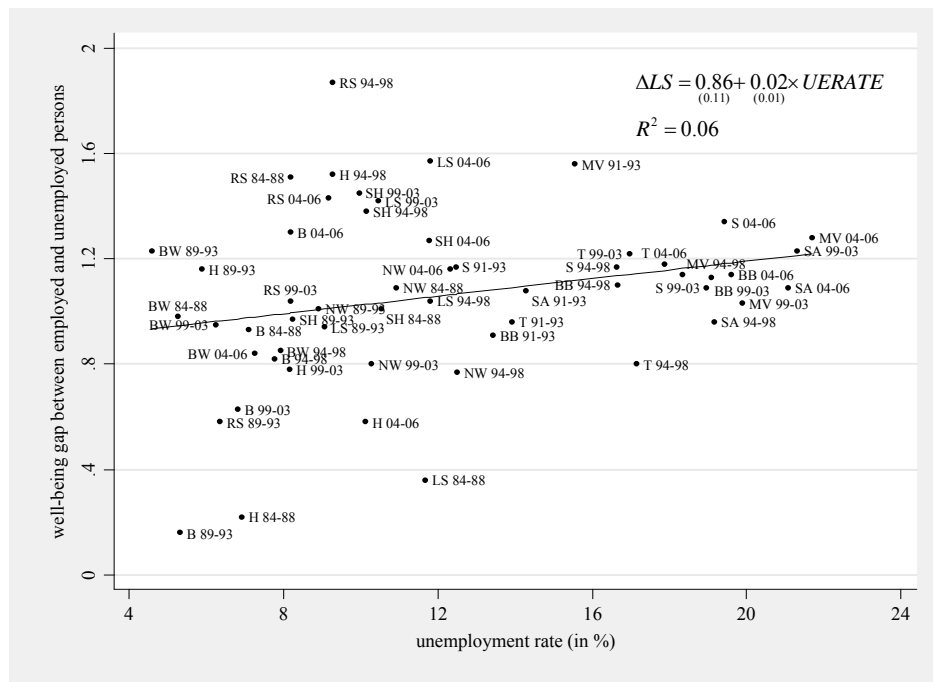
Notes to both figures. Observations by German Federal States averaged over the following periods: 1984-1988 (only former West Germany), 1989-1993 (1991-1993 for East Germany), 1994-1998, 1999-2003, and 2004-2006. We exclude the three city states (Berlin, Hamburg, Bremen) due to a lack of sufficient observations (less than three observations per period). Key: B = Bavaria, BB = Brandenburg, BW = Baden-Württemberg, H = Hessen, LS = Lower Saxony, MV = Mecklenburg-West Pommerania, NW = North Rhine-Westphalia, RS = Rhineland-Palatinate/Saarland, S = Saxony, SA = Saxony-Anhalt, SH = Schleswig-Holstein, and T = Thuringia.

Figure 1 reveals a negative relationship between regional unemployment and the employed-unemployed well-being gap for men. This is consistent with a social norm effect: there is always a life satisfaction gap between the employed and the unemployed, but the reduction in well-being following the loss of one's job is smaller in regions where there is more unemployment. Figure 2 presents the same data for women. It is difficult to detect any social norm effect here, with the relationship appearing to be positive, if anything, rather than negative.

3.2 Regression results

To analyze the effects of aggregate unemployment on individual well-being, we now turn to econometric analysis. Since life satisfaction is an ordinal variable that is potentially affected by individual-specific unobservable characteristics, we apply a fixed-effect conditional logit model (see Ferrer-i-Carbonell and Frijters, 2004).

The results are presented in the first two columns of Table 1. The estimation results with German data are consistent with those found in a number of other countries (see the references in our Introduction). Even after controlling for the associated income loss, own unemployment is associated with sharply lower well-being. With respect to the effects of others' unemployment, the coefficient on the main effect of regional unemployment is significant and negative. This highlights two channels via which unemployment reduces individual welfare. It first generates well-being losses for those who become unemployed, but also produces negative externalities on those who remain employed.

When we look at the effect of regional unemployment on unemployed men, we see that there is a strong opposing effect (statistically significant at the 10% level). Unemployed men suffer significantly less from surrounding unemployment than they would if they were employed. The estimated positive coefficient on the interaction term is, however, smaller in absolute size than the negative coefficient on the unemployment rate. Both the unemployed and employed are negatively affected by regional unemployment, but the magnitude of this effect is much smaller for the former.

There is no evidence of a social norm effect for women. The main effect of regional unemployment is negative (although statistically insignificant), and, contrary to men, unemployed women feel worse in regions with higher unemployment rates.

The other determinants of life satisfaction, which we include as control variables in our regression, have the expected signs for both sexes.[46] Income is strongly positively correlated with well-being. Working part-time is less good than full-time employment. Cohabiting or being married is associated with higher life satisfaction than being single, while being divorced and living without a new partner reduces men's life satisfaction, but not that of women. Widowhood has an insignificant effect for both sexes. Respondents with children report (insignificantly) higher life satisfaction scores. Last, education is positive, although significantly so only for women, and people are significantly less happy in their forties than in their twenties.

While widely-used in the "economics of happiness" literature, the conditional fixed effect logit model suffers from two disadvantages. First, the recoding of eleven life satisfaction scores into just two categories obviously discards a lot of information. Second, and perhaps more importantly, it is not necessarily true that the signs of the estimated coefficients correspond to the signs of their marginal effects. Ai and Norton (2003) show that non-linear regression models suffer from this problem and that special care has to be taken when interpreting the coefficients. To deal with both issues, we appeal to a novel estimation method that retains the original dependent variable and avoids the pitfalls of non-linear models – the Probit-adjusted ordinary least squares (POLS) approach of Van Praag and Ferrer-i-Carbonell (2004). In contrast to standard OLS, which assumes equal distances between the life satisfaction categories, POLS transforms these latter on the entire real axis by using the overall sample distribution. Van Praag (2005) shows that the results generated by traditional ordered probit and Probit OLS are the same up to a multiplication factor. The advantage of POLS, as compared to ordered probit, lies in the possibility of applying panel data methods, such as individual fixed effects.

Columns 3 and 4 of Table 1 present the results from a POLS regression with fixed effects. The results are qualitatively similar to those from the conditional logit estimation. Own unemployment hurts, as previously, and the main effect of regional unemployment is negative, for both men and women.

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[46] We also estimated a benchmark specification without any control variables. The results remain essentially unchanged. The well-being gap between the employed and the unemployed is smaller in regions with higher unemployment. Both groups are negatively affected by regional unemployment, where the employed suffer more than the unemployed.

Table 1: Regression results

	Conditional FE logit		Probit-adjusted OLS	
	(1)	(2)	(3)	(4)
	Men	Women	Men	Women
Reference category	Full-time employed, single, less than 30 years old	Full-time employed, single, less than 30 years old	Full-time employed, single, less than 30 years old	Full-time employed, single, less than 30 years old
Unemployed	-1.170***	-0.344***	-0.625***	-0.235***
	(0.117)	(0.116)	(0.035)	(0.037)
UE Rate (in percentage points)	-0.026***	-0.012	-0.010***	-0.006**
	(0.008)	(0.008)	(0.002)	(0.003)
UE Rate x unemployed	0.015*	-0.031***	0.014***	-0.005**
	(0.008)	(0.008)	(0.002)	(0.003)
Household income p.c. (Euro per month) /1000	0.344***	0.315***	0.120***	0.106***
	(0.033)	(0.035)	(0.009)	(0.010)
Part-time	-0.282***	-0.158***	-0.102***	-0.078***
	(0.071)	(0.035)	(0.022)	(0.011)
Cohabitation	0.333***	0.456***	0.125***	0.156***
	(0.049)	(0.058)	(0.015)	(0.018)
Married	0.524***	0.344***	0.187***	0.122***
	(0.060)	(0.068)	(0.019)	(0.022)
Divorced	-0.522***	-0.065	-0.200***	-0.051*
	(0.085)	(0.084)	(0.026)	(0.027)
Widowed	-0.036	-0.189	-0.017	-0.166***
	(0.210)	(0.140)	(0.065)	(0.045)
Number of children	0.015	0.024	0.007	0.007
	(0.018)	(0.022)	(0.006)	(0.007)
Years of education	0.003	0.044**	-0.002	0.012**
	(0.017)	(0.020)	(0.005)	(0.006)
30 ≤ age < 40	-0.021	-0.013	-0.012	-0.005
	(0.043)	(0.048)	(0.013)	(0.016)
40 ≤ age < 50	-0.132**	-0.073	-0.046**	-0.040*
	(0.066)	(0.073)	(0.020)	(0.023)
50 ≤ age	-0.103	-0.112	-0.047*	-0.044
	(0.091)	(0.101)	(0.028)	(0.032)
Individual fixed effects	yes	yes	yes	yes
Wave dumies	yes	yes	yes	yes
Log likelihood	-30,161	-25,143		
R²			0.057	0.041
Number of observations	64,774	54,338	69,712	59,466

*Notes: Conditional Fixed Effect Logit and Probit-adjusted OLS estimations with individual fixed effects and time fixed effects. Standard errors in parentheses. * denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level.*

The social norm effect, however, is again only found for men. In this specification, the sum of the main and interaction effects of regional unemployment is positive (although statistically insignificant), suggesting that others' unemployment may even increase the well-being of unemployed men. Women, on the other hand, are adversely affected by regional unemployment whether they be employed or unemployed. Both POLS and conditional logit estimation thus suggest that regional unemployment produces negative externalities on the employed, but there is evidence of a social norm effect, whereby greater regional unemployment reduces well-being less, or may at the limit even be welcome, for unemployed men.

4. CONCLUSION

Unemployment is widely considered as generating negative externalities. Greater unemployment makes the employed feel less secure about being able to keep their job in the future, while the unemployed suffer from worse prospects of finding a new job. However, in addition to these negative effects, there may well be a counteracting positive impact for the unemployed: if more people suffer the same fate, one's own unemployment might be easier to bear. This is termed the "social norm effect of unemployment". In this paper, we see whether a social norm effect of unemployment – whereby aggregate unemployment reduces the well-being of the employed, but has a smaller negative, or even positive, effect on the unemployed – can be found in Germany. Our panel regression analysis suggests that, while both employed men and women feel worse in regions with higher unemployment, there is evidence of a social norm effect for unemployed men (but not unemployed women). This same disparity between men and women was found in BHPS data in Clark (2003). The social norm effect, however, is too weak to counterbalance the generally negative effect of the unemployment rate. Regional unemployment does not produce benefits for anybody, but it hurts the employed much more than the unemployed.

Our results have important policy implications. The existence of a social norm effect of unemployment can be an explanation of unemployment hysteresis. If an increase in regional unemployment narrows the well-being gap between the employed and the unemployed in this region, the incentives for the unemployed to look for a new job become weaker (see Clark 2003). A temporary labour market shock can thus have long-lasting employment effects. This means that policy interventions to fight rising unemployment have to be prompt. If policymakers wait too long, a new social norm of higher unemployment might become established. Fighting unemployment later will then become an even harder task.

CHAPTER 5

LABOUR SUPPLY, LIFE SATISFACTION AND THE (DIS-)UTILITY OF WORK[47]

1. INTRODUCTION

The standard neoclassical theory of individual labour supply considers income and leisure as the source of individual utility. Work is seen as a bad necessary to create income for consumption. The derived assumptions of the economic theory suppose a utility-decreasing influence of work at the margin. The theory is based on the consumption-leisure trade-off with a limited amount of time that the individual can allocate to work and leisure, with the individual choosing the optimal labour supply that maximizes utility. Since working hours entail a reduction in leisure time, the individual utility loss caused by labour time is implicitly presumed.

The empirical findings of the fast-growing field of happiness economics show, however, that unemployment generates a sharp utility loss that is not caused by the loss of income. Life satisfaction decreases even if the individual is compensated entirely for the associated income reduction. This additional effect, which is substantial, is generally labelled as the non-pecuniary or psychological costs of unemployment.[48] Employment, on the other hand, leads to a rise in individual happiness. This result seems to contradict the economic assumptions of the disutility of work.

However, we have to distinguish between two different aspects here. The neoclassical theory assumes a disutility effect at the margin since an additional working hour causes disutility. But it does not say anything about the total utility effect of work as a whole. So it could be that the entire welfare effect of work is positive whereas at the margin the individual experiences disutility of work. Empirical happiness studies, in contrast, estimate only the total life satisfaction effect of labour. These results indicate that the aggregate

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[47] A modified version of this chapter has been published. See Rätzel, S. (2009). "Revisiting the neoclassical theory of labour supply – Disutility of labour, working hours, and happiness.", FEMM Working Paper Series, Otto-von Guericke-University Magdeburg, 5/09.

[48] Studies presenting the negative impact of unemployment come, for example, from Clark and Oswald (1994), Winkelmann and Winkelmann (1998), Frey and Stutzer (2000), Di Tella et al. (2001) and Clark (2003).

effect of work is positive. But it is ambiguous how labour time influences happiness at the margin. Hence, the seeming contradiction may not, in fact, be a contradiction at all.

The present article pursues two aims. First, I analyze the utility effect of working time on life satisfaction at the margin to test the theory assumptions. If unemployment causes negative welfare effects even after we control for income, the utility of the first working hour should be positive because, in the state of unemployment, leisure time is maximal and working hours are zero. Consequently, the first working hour would increase the individual utility level. This apparently curious result arises because the loss of working hours is associated with non-pecuniary costs. On the other hand, this positive utility effect may only be the case for shorter working hours and could turn to disutility for longer working time. To shed more light on these utility effects of work, the direct influence of the wage and working time on individual happiness will be examined using the happiness approach. The econometric analysis allows us to examine the trade-off between wages and working hours at a constant utility level. By using compensating variation, the optimal wage that compensates the individual for an additional working hour can thus be determined.

Second, real working time is often not identical to the preferred individual labour supply time. Employees cannot choose the working time that maximises their utility but are rather restricted to specific contracts and compulsory working hours. Our data provide a possibility to analyze the association between life satisfaction and the mismatch between the time the individual works and the time the individual would like to work. Using the deviation from the preferred individual labour supply, we are able to analyze the influence of underemployment (employees would prefer longer working hours) and overemployment (employees would prefer shorter working hours) on individual life satisfaction. This is particularly interesting because the deviation is exogenously given and not a result of an individual decision and, hence, should have a stronger influence on life satisfaction.

I will proceed as follows. In the next section, I provide a short review concerning the effects of employment status on life satisfaction. In Section 3 the theoretical idea is described in a short model. Section 4 represents the data and provides useful descriptive statistics and Section 5 describes the underlying methodology and hypotheses. The empirical results are presented in Section 6 and the last part discusses the results and concludes.

2. LIFE SATISFACTION AND WORK

The study of the influence of work on individual well-being has a long history in the scientific world, especially in psychology. Numerous psychologists are engaged in researching the impact of job loss on individual life satisfaction (e.g. Fryer and Payne, 1986; Feather, 1990; Argyle, 2001; Lukas et al., 2004). Economists rejected the use of subjective well-being data until the mid 1990s by reason of scepticism concerning the validity and reliability of the subjective data. This view changed following the seminal paper by Clark and Oswald (1994)[49] and subsequent discussions in The Economic Journal, which constituted the starting point for this dynamically growing research field.[50]

Following Clark and Oswald (1994), who examined the impact of unemployment on mental well-being, a strand of further articles regarding this topic has emerged. Gerlach and Stephan (1996) analyze the effects of unemployment in Germany and find high non-pecuniary costs following the loss of the job. Winkelmann and Winkelmann (1998) show that the non-pecuniary costs of unemployment are considerably higher than the happiness loss caused by the income deprivation. Blanchflower and Oswald (2004) confirm the strong welfare loss also for the US and Great Britain. Further studies come from Korpi (1997) for Sweden, Woittiez and Theeuwes (1998) for the Netherlands as well as from Frey and Stutzer (2000, 2002), Clark (2003, 2006) and Di Tella et al. (2001, 2003).

To sum up, each of the studies confirms the adverse impact of unemployment on well-being with the main effect not being the accompanying decrease in income but the psychological costs caused by unemployment. Social isolation and stigmatization, loss of self esteem and appreciation, depression and future insecurity are detrimental to individual life satisfaction. These findings are confirmed by studies in different countries and varying data sets. The implication of the result is simple - an individual is better off in employment than unemployment, even if he has to sacrifice leisure time without earning more money.

The main question of this article, the relationship between hours of work and general well-being, is virtually unexplored in the economics literature. Empirical studies come in a large part from the psychological sciences and focuses on aspects of psychological well-being such as distress, burnout or fatigue. In particular, the effects of long work hours on different outcome variables are considered, e.g. health, work/family conflicts and the

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[49] The first remarkable paper comes from Easterlin (1974). However, his ideas had not found sufficient recognition at this time.

[50] See Clark et al. (2008) for the number of recently published articles.

quality of relationships.[51] The results are ambiguous, with some studies finding a detrimental effect of long working hours and other studies not confirming this correlation.[52]

Economists have focused primarily on the relationship between working hours and a subgroup of satisfaction, namely job satisfaction. Clark and Oswald (1996) and Clark (1997) found a negative, but rather weak, correlation of working hours and job satisfaction. Praag et al. (2003) analyzed the influence of various well-being domains, including job satisfaction, but found ambiguous results.

Apart from the studies concerning job satisfaction, the influence of working time on individual well-being has so far been neglected by economists. One reason could be that the empirical findings employing working hours as an explanatory variable are quite inconsistent. That may have lead to less attention to this topic than would have been the case if the results were more distinct, like the correlation between unemployment and life satisfaction, for example. Just recently two papers that consider working time as one of the relevant variables for life satisfaction have been published. Pouwels et al. (2008) analyze the influence of income on life satisfaction under the assumption that more income has not only a positive influence on happiness but also a negative side: it is mostly generated by more working hours. Hence, neglecting working hours in the analysis would lead to an underestimation of the positive effect of income. They come to the result that longer working hours reduce happiness significantly. Due to the negative effect of labour time the influence of income is usually underestimated by 12% for women and 25% for men. However, the study has some critical characteristics that may affect the results. The authors use a subsample of only one wave, containing 2,700 observations, of the German Socio Economic Panel (GSOEP) from the year 1999. Due to the restriction of one year a fixed effect regression was not practicable. Additionally, the authors assume a log-linear relationship between working hours and happiness, which is a disputable assumption. This implies that the disutility of an additional working hour is large if the number of hours already worked is small, but that the negative impact of an additional hour of work diminishes as the number of working hours increases.

The second study, by Booth and van Ours (2008), uses eight waves of the British Household Panel Survey to analyze the effect of part-time work and partnered well-being. Although not the main focus of the study, they analyze the influence of working hours on

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[51] See Staines and Pleck (1983), Gutek, Searle and Klepa (1991), van der Hulst (2003) and Caruso (2006).
[52] An interesting review of the related literature is given by Barnett (1998).

life satisfaction. Considering the panel estimation results, they do not find significant effects of working hours on life satisfaction for men and for women but the tendency is rather positive. Well-being of both men and women benefits from full-time work compared to working part-time. Additionally, they are able to show a negative correlation between working hours and the satisfaction with hours worked and job satisfaction for women.

One shortcoming of all the cited studies (except for the study by Booth and van Ours) is that they did not consider individual specific fixed-effects, which influence individual satisfaction to a large degree. Lykken and Tellegen (1996) find evidence that up to 80% of the well-being variation is influenced by individual genes and personal traits. Ferrer-i-Carbonell and Frijters (2004) have recently shown that time invariant individual specific effects are very important in explaining happiness. To account for the recent findings, I will base all estimations on fixed-effects models using the extensive panel dataset of the GSOEP, which offers an excellent opportunity to combine highly qualitative data with fixed-effects models.

Indeed the fact that this area has received little attention from economists is surprising when one considers that this question, whether life satisfaction increases with working hours, is of primary importance for economics. If lack of work causes individual utility losses, work should instead increase utility, contrary to the disutility assumption.

3. NEOCLASSICAL THEORY AND NON-PECUNIARY UTILITY OF WORK

The aim of this paper is an empirical study of the assumption of the utility of work and the choice of the optimal labour supply. The starting point is the decision of the individual whether to offer his or her manpower. The positive choice is justified with the desire for more income to increase consumption possibilities. Following firstly the neoclassical theory, I consider F as leisure time, L as working time, C as consumption and the utility function $U(C, L)$ with $U_C > 0$ and $U_L < 0$ as well as $U_{CC} < 0$ and $U_{LL} > 0$. The individual faces a trade-off between the positive utility of consumption and the negative impact of work. Under consideration of $-U_L = U_F$, the individual maximizes his utility so that the marginal rate of substitution equals the real wage rate with $-U_L / U_C = w / p$. Figure 1 represents the utility-maximizing labour supply as a function of consumption and leisure time. As is well known, the indifference curve I_1 (dotted) is decreasing and the optimum is reached where it is tangent to the budget line.

The curve changes to a U-shaped form if we now assume that employment generates non-monetary benefits in addition to earned income. Intangible benefits can comprise several types, starting from self-realization, self-affirmation, being in a social environment and part of society to the point of status seeking.

Figure 1: Individual Consumption-Leisure Decision
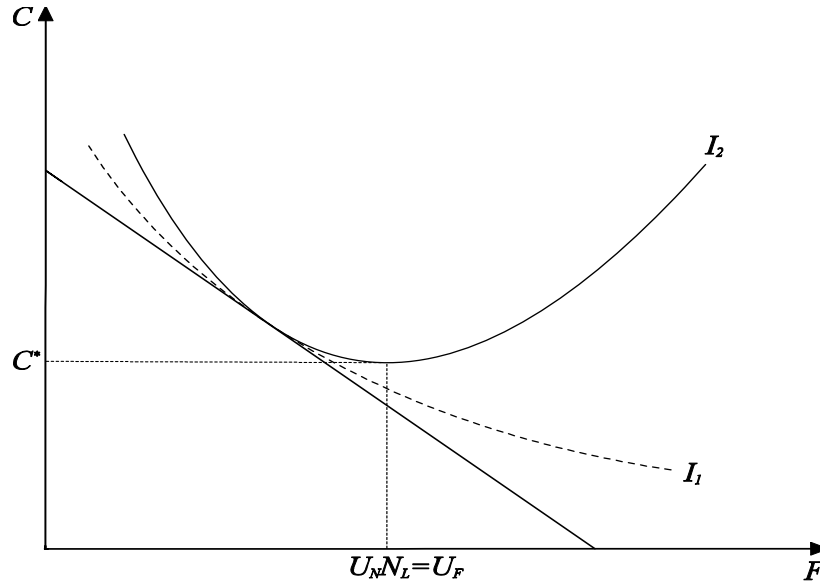
To account for the non-pecuniary benefits of work I modify the standard assumptions and consider the following model:

$$U = U(C, F, N),$$ (1)

where U is a utility function dependent on consumption C, leisure time F and non-pecuniary benefits of work N. The individual is restricted by the time limitation T and can split the available time in leisure and working time so that it follows that $F = T - L$. Consumption and the non-pecuniary benefits are influenced by working time L. The utility function can be rewritten as:

$$U(C, L) = U(C, T - L, N(L))$$ (2)

with

$$U_C > 0 \quad \text{and} \quad U_{CC} < 0$$

$$U_F > 0 \quad \text{and} \quad U_{FF} < 0.$$

Additional to the positive effects of consumption and leisure time, I further assume positive marginal utility of working time that decreases with increasing working hours:

$$U_N > 0 \qquad \text{and} \qquad U_{NN} < 0$$

Accordingly, the individual faces a new trade-off and maximization calculus between leisure time and non-pecuniary benefits of work. We can derive the net marginal utility of work with:

$$U_L = U_N N_L - U_F . \qquad\qquad (3)$$

Hence, labour time causes two different effects: first, increasing utility due to intangible benefits of work shown by the first term on the right-hand side, and, second, decreasing utility due to a reduction in leisure time. There is an unique level of working time L^* for every constant consumption level C (as exemplarily shown by point $(C^*; U_N N_L = U_F)$ in Figure 1) where the marginal disutility of labour equals the marginal utility of labour so that

$$U_L = 0 = U_N N_L - U_F . \qquad\qquad (4)$$

A rise in the individual working time from L^* leads to:

$$\left.\begin{array}{l} \dfrac{\partial U}{\partial L} > 0 \\[2mm] \dfrac{\partial U}{\partial L} \leq 0 \end{array}\right\} \quad \text{if} \quad \begin{array}{l} U_N U_L > U_F \\[2mm] U_N U_L \leq U_F \end{array} .$$

The integration of the non-pecuniary benefits changes the indifference curve as shown in Figure 1. The indifference curve decreases in F as long as labour is a source of disutility but turns upwards behind the level L^* and more leisure time has to be compensated by more consumption. At a given wage and, hence, consumption level the individual can increase utility by working more. The advantage of the following empirical analysis is the possibility of controlling for the wage rate and, therefore, of determining the optimal labour-leisure decision of the individual in dependence on different wage levels.

Figure 2 demonstrates the intangible utility of work. Following the standard assumption of labour disutility, the dotted line in the figure represents the marginal disutility curve of labour. Marginal disutility increases with the amount of working time L. The negative

effects translate into negative aggregate individual utility of work, which sums up to the area between the dotted line and the abscissa.

Figure 2: Non-Pecuniary Utility of Work
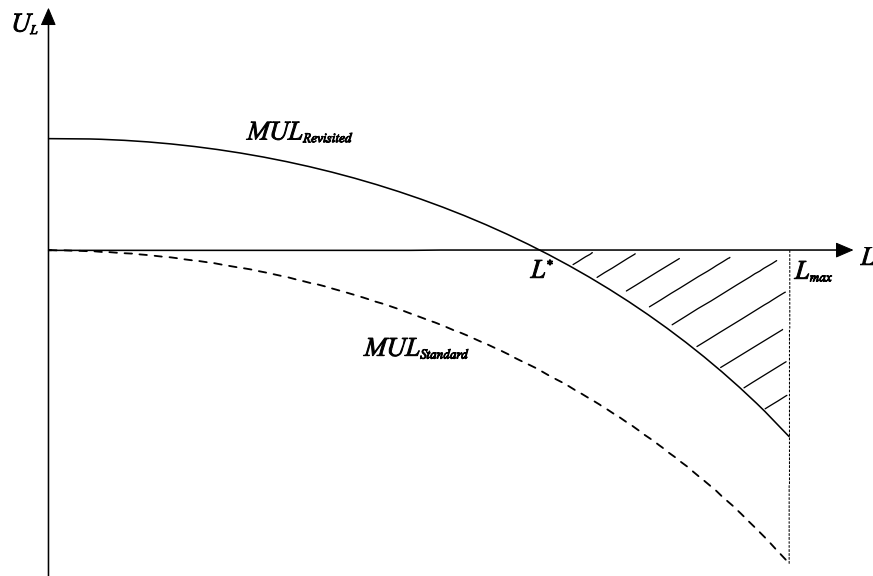
Supposing positive marginal utility for working hours, we obtain a form as shown by the continuous line. Marginal utility is positive but decreasing in working time. Aggregate utility rises until the point the marginal utility of leisure exceeds the marginal utility of labour. A zero, or even positive, aggregate utility of work implies that an individual would offer his labour for every positive wage rate (even for a negative wage rate in the case that the utility is positive). This seemingly surprising result is not as astonishing at second glance. People are often engaged in voluntary services where they supply work for which they do not receive remuneration. For instance, an unemployed person, a retired person or a homemaker who is engaged in voluntary services would offer his or her labour until U_L is zero, which is at L^*. The numbers reveal the importance of this kind of service. More than one third of the German population or, in absolute terms, 23.4 million people were engaged in voluntary services in 2004.[53] The figures for the US and the UK are even higher. About 50 percent of the population in both countries are engaged in voluntary work, making this the highest relative participation rate among the developed countries.[54] Evidently this kind of job generates positive non-pecuniary effects. In some cases, people

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[53] Gensicke, Picot and Geiss (2006).
[54] Anheier and Salamon (1999).

engaged in voluntary services even pay money to carry on this job, e.g. for travel expenses, workwear, etc.

Another indication that work indeed generates non-monetary benefits can be found in observing the results of a recently introduced labour market reform in Germany. Following a law from 2004, individuals that are unemployed longer than one year have to accept a public job offer where they must work in a public job creation scheme. If they reject the offer, their unemployment assistance will be cut. These public job schemes are called one-euro jobs because they do not get a wage but receive a representation allowance of one euro an hour. Besides the requirement to do this job, unemployed individuals can apply for the one-euro jobs themselves. That means they apply for the job and have to work about 120 hours a month to get the representation allowance of only 120 euro during this time. In fact, they are working nearly for free.[55] Surprisingly, the labour supply for the one-euro jobs is much higher than the public demand for this kind of work. The government cannot offer enough job opportunities to satisfy every unemployed person who would like to participate and people queue in front of the employment office to obtain one of the public jobs.

Both illustrations are not proof for the benefits of work. However, they give an indication that there are positive utility effects and that working without remuneration is not as unusual as it seems at first glance. To shed more light on the strength of the effects, I turn to the analysis of the correlation between working time and well-being in the following section.

4. DATA AND DESCRIPTIVE STATISTICS

The empirical analysis is based on the German Socio-Economic Panel (GSOEP).[56] I use the data set including 23 waves for the period from 1984 to 2006. I consider all working age individuals between ages 18 and 60 that are active in the labour force. This yields an unbalanced panel with more than 160,000 person-year observations.[57] The great advantage of the GSOEP lies in its high quality data concerning employment status and its panel

[55] Besides this, they do not even substantially improve their chances for a new regular job because the public jobs are mostly unrelated to the work the unemployed person had done before and different to the job the unemployed person is applying for in the regular labour market (IAB-Kurzbericht 2008).
[56] The data used in this publication were made available by the German Socio-Economic Panel Study (GSOEP) at the German Institute for Economic Research (DIW), Berlin.
[57] The data used in this paper was extracted using the Add-On-package PanelWhiz for Stata. PanelWhiz (http:\\www.panelwhiz.eu) was written by John P. Haisken-DeNew (john@panelwhiz.eu). See Haisken-DeNew and Hahn (2006) for details. The PanelWhiz generated do file to retrieve the data used here is available from me upon request. Any data or computational errors in this paper are my own.

structure, which allows us to follow the same individual over several years. The subjective well-being data are generated from answers to a question in the GSOEP that asks respondents: "How satisfied are you with your life, all things considered?" The answer to this question takes discrete values from 0 (completely dissatisfied) to 10 (completely satisfied).

I start with the descriptive statistics of the data. Table 1 shows the distribution of life satisfaction levels broken down by employment status and gender for the period considered. The average level of life satisfaction for employed men (women) in Germany lies in the upper half of the scale at 7.07 (7.05). Only about 7 percent in both groups report a life satisfaction value in the lower half of the scale (strictly less than 5), whereas slightly over 80 percent locate themselves in the upper half (6 and above). In contrast to these high life satisfaction scores are the distinct lower values of the unemployed men as well as women.[58] Whereas the life satisfaction levels were nearly equal for the employed, unemployed men have much lower scores than unemployed women. The first statistic confirms the expectation that work increases individual utility, but we cannot make any causal interpretation at this point without a more sophisticated multiple regression estimation. The results could be also driven by reverse causality – people with lower life satisfaction scores may have a higher probability to lose their jobs.

Table 1: Distribution of life satisfaction in Germany (1984-2006)

Life Satisfaction	Employed		Unemployed	
	Men	Women	Men	Women
0 – completely dissatisfied	0.3	0.3	2.7	1.8
1	0.2	0.3	1.9	1.5
2	0.9	0.9	5.0	3.8
3	2.2	2.2	9.0	6.8
4	3.2	3.4	9.2	8.3
5	10.9	12.3	23.0	23.1
6	11.5	11.1	14.8	14.6
7	24.1	22.9	15.9	16.8
8	31.3	30.5	12.9	16.1
9	10.8	11.1	3.5	4.8
10 - completely satisfied	4.6	5.0	2.1	2.4
Total	100.0	100.0	100.0	100.0
Average Life Satisfaction	7.07	7.05	5.47	5.80
Observations	82,512	66,375	7,756	8,574

Source: GSOEP, own calculations.

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[58] Since I do not control for income, the lower well-being scores are the total disutility effect of unemployment caused by the loss of income and the non-pecuniary costs of unemployment.

Table 2 shows the distribution of working hours a day of the German population for men and women. The mean working time differs markedly by gender. With a mean time of 6.73 hours, women work significantly less than men, who work 8.83 hours. Whereas the labour hour distribution for women tends to shorter working hours, the peak working time of 8 hours is equal for both groups.

Table 2: Distribution of working hours a day of the employed in Germany (1984-2006)

Working Hours a Day	Men (Percentage)	Women (Percentage)
1	0.5	2.5
2	1.3	6.3
3	0.4	3.9
4	0.7	10.6
5	0.5	7.1
6	1.2	8.1
7	6.0	7.8
8	42.3	34.6
9	18.0	9.8
10	15.0	5.7
11	4.0	1.1
12	6.0	1.5
13	1.3	0.3
14	1.9	0.5
15	0.4	0.1
16	0.5	0.1
Mean	8,83	6,73

Source: GSOEP, own calculations.

Note: A working week comprehends five working days.

The focus of our analysis is the dependence of life satisfaction on the working time of the individuals. To get a first impression, Figures 3 and 4 represent the well-being of men and women against individual working hours a day. If working time generates disutility, we would expect a declining chart with incremental labour time. However, increasing working time also leads to higher income and expands the consumption possibilities, which would operate against the disutility influence.

To avoid income impact, I cluster the individuals in different income brackets and observe only individuals in the same income intervals.[59] The continuous line in Figure 3 shows the effect of working hours on life satisfaction for all employed men and the different dashed lines consider different monthly net wage intervals (in euro).[60] The first

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[59] The income intervals differ for men and women. Due to a lower mean income of women we choose smaller income intervals for women.

[60] Working hours are restricted to three and fourteen hours a day because there were too few observations outside of this range.

noteworthy result is that a life satisfaction increase comes along with higher monthly net wages for constant working hours. This relation is fairly stable: only the high income earners are worse off if labour time is less than six hours. Remarkably, individuals that work only very few hours a day have a mean life satisfaction of about 6.8 points. If we now compare the unemployed, who are not working at all, we detect a strong rise in well-being of about one point even for the low income earners. This is evidence that the non-pecuniary utility of labour is partly caused by being a part of the employed group independent of the working hours. It seems that employment status alone can explain to some extent the well-being differences between employed and unemployed found in several studies. Apparently, it is the knowledge and security of having a job, belonging to society, or status that makes people happy whereas unemployment causes a stigma.

The second interesting insight is the inverse U-shaped form of the well-being curves. Indeed, life satisfaction increases with working hours until it reaches a maximum that is between seven and nine working hours a day, depending on the income group. Rising working hours come along with an increase in well-being instead of causing a negative utility effect. However, after the maximum is reached, the effect becomes negative, in line with the standard economic assumption. It seems working hours cause positive marginal utility for men at the beginning and turn into disutility after they have reached their peak.

The influence of working hours on life satisfaction for women is presented in Figure 4. The positive effect of income on well-being levels is still valid but is diminished. Several reasons are conceivable. Working income generated by women plays a lesser role in the total household income because, in most households, the man still earns the bigger share of the total income. Furthermore, the income brackets are smaller for women in as much as the differences are only 750 euro instead of the 1500 euro for men.[61] A look of the relationship between working hours and life satisfaction provides another insight. Life satisfaction for women is maximized at low hours and is decreasing steadily. Instead of an inverse U-shaped curve, we see a falling chart although life satisfaction is partly constant with increasing working time. For women in the high income intervals, for example, well-being is nearly constant until working hours exceed a value of about twelve.

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[61] Different income brackets for men and women are necessary because the income distribution for women and men differ significantly.

Figure 3: Life Satisfaction and working hours a day of the employed men in Germany
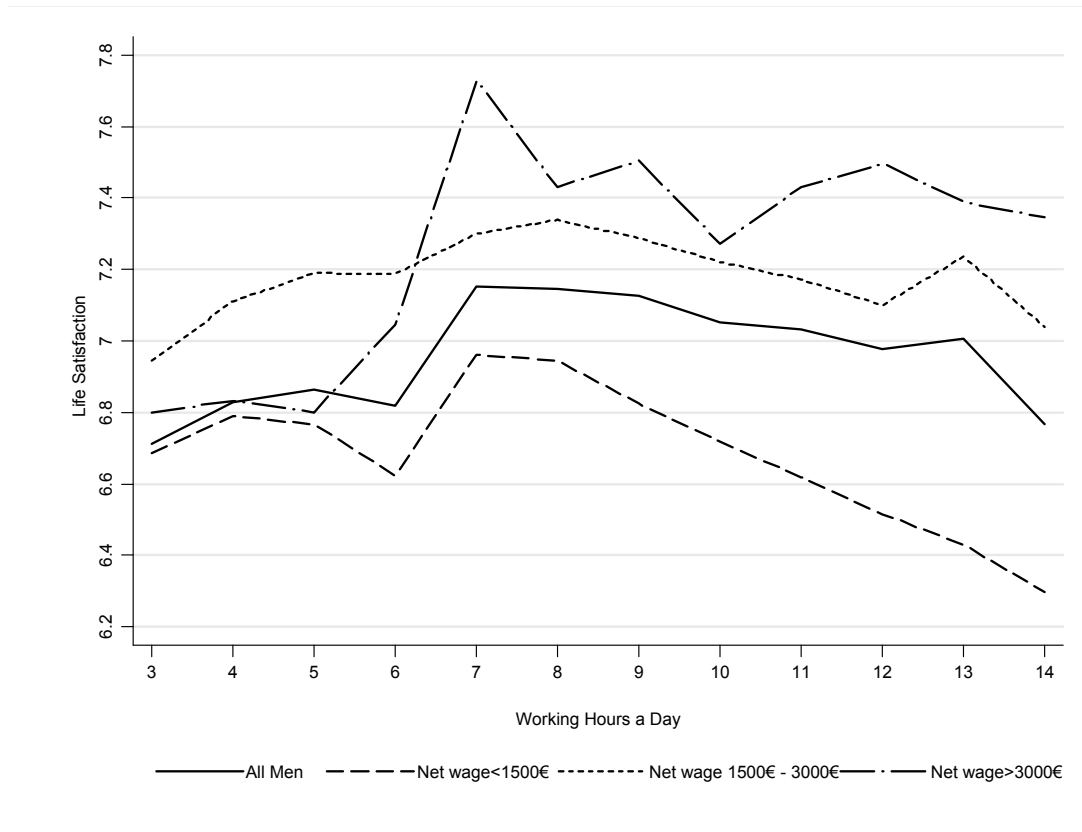
Source: GSOEP, own calculations.

Three main findings of the descriptive statistics are noteworthy. First, a higher net wage goes along with higher life satisfaction scores for men and women. Second, there seem to be positive non-pecuniary benefits of employment for both groups in comparison with the status unemployed. Employed individuals have much higher well-being levels than the unemployed even if they only work very few hours. The stigma of unemployment seems to be strong. Third, working hours correlate positively with life satisfaction for men until a maximum is reached. After the peak there is a negative relationship between working hours and life satisfaction. For women, though, we find a constant, or slightly negative, relationship for the first working hours that becomes more negative, the more hours are worked.
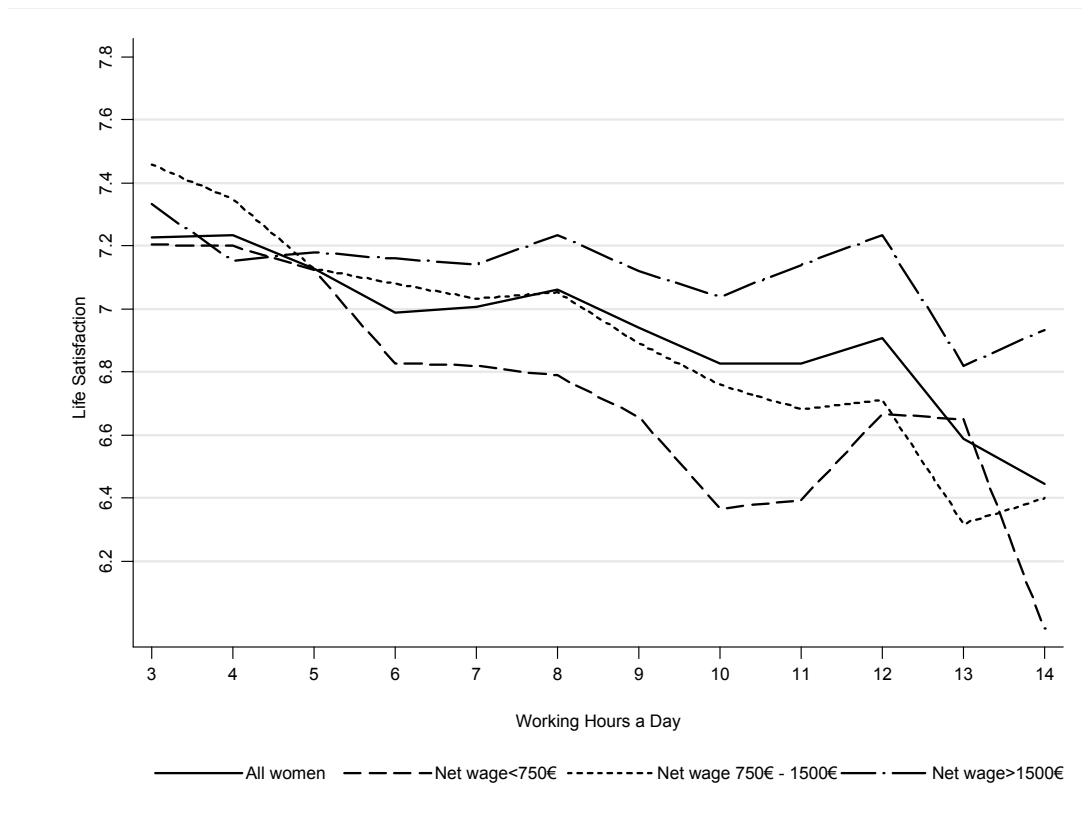
Figure 4: Life Satisfaction and working hours a day of the employed women in Germany

Source: GSOEP, own calculations.

5. HYPOTHESES AND ECONOMETRIC FRAMEWORK

The descriptive statistics in the preceding section give only an overview and are not able to draw a causal interpretation of the separate effects. To obtain a detailed analysis, we have to control for several other factors that potentially influence well-being by using multiple regression methods. The starting point is the individual decision to supply labour at all. A rational individual who decides to supply labour should have a higher life satisfaction level than in the state of involuntary unemployment.[62] Therefore, employment should influence happiness positively whereas unemployment should be correlated negatively with happiness. To test for the first hypothesis I use the following regression:

$$LS_{it} = \beta_1 Y_{it} + \beta_2 UE_{it} + \sum_m \gamma_m X_{m,it} + v_i + \mu_t + \varepsilon_{it}. \tag{5}$$

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[62] An individual is called unemployed if he is registered as unemployed, i.e. is looking for a job or is willing to work. All other individuals who are not working voluntarily are assigned to the out-of-labour-force group.

The true individual life satisfaction is unknown, but instead the self-reported level, which is a discrete ordered variable, is observable. LS_{it} is the well-being level of individual i at time t. Y_{it} is the individual income in euro adjusted by the consumer price index und UE_{it} is a dummy variable taking the value of 1 if the individual is unemployed and 0 otherwise. The vector X_{it} includes m socio-economic and demographic characteristics such as family status, sex, age, education, etc. v_i is an individual fixed effect that controls for individual specific characteristics, μ_t denotes a year fixed effect that captures shocks affecting all individuals in each year and ε_{it} is a random error term. I expect a positive β_1 coefficient to indicate effects of income increasing life satisfaction and a negative β_2 coefficient to indicate influences of unemployment decreasing happiness. Since we control for income, a negative unemployment coefficient indicates the strength of the non-pecuniary costs of unemployment.

The second, and main, hypothesis to be tested is whether working time leads to individual disutility or not. Therefore, I consider all working individuals with positive working hours in a second estimation. Outliers at the highest end of the working time distribution are not included by removing all individuals with more than sixteen working hours a day for plausibility reasons. To determine the effects of working time on well-being, I use the equation:

$$LS_{it} = \alpha + \beta_1 W_{it} + \beta_2 \bar{Y}_{it} + \beta_3 L_{it} + \beta_4 L_{it}^2 + \sum_m \gamma_m X_{m,it} + v_i + \mu_t + \varepsilon_{it}, \qquad (6)$$

where W_{it} is the net wage of individual i at time t. Because the net wage is not the only income source, I also integrate the variable Y_{it} that denotes the entire net household income of individual i less the own net wage. I also include a household size variable in the estimation to control for different effects of the income for varying household sizes. Since we consider both income variables, it is possible to separate the effect of the own wage from the effect of the remaining household income, which is exogenous and not related to the individual work condition. We account for working time with the variable L_{it}, which denotes individual working hours a day. Since a non-linear influence of working hours is expected, I also include the square of working hours L_{it}^2. The estimation specification allows us to test whether various working hours have a direct impact on well-being and in what direction the impact operates. Following the standard theory of labour supply, we would expect:

working time is utility decreasing: raising working hours decrease well-being if we control for the net wage and the household income: $\beta_3 < 0$;

increasing marginal disutility: marginal disutility rises with increasing working hours: $\beta_4 < 0$.

The competing hypotheses are:

working time is utility increasing: working hours correlate positively with well-being even after controlling for the net wage and other well-being influencing variables: $\beta_3 > 0$;

excessive work is utility decreasing: the influence of working hours on life satisfaction is hill-shaped; hence extreme working hours lead to a decline in well-being: $\beta_4 < 0$.

Using the second estimation, we are able to determine the direct effect of working time on well-being after controlling for other variables. Therefore, we obtain the influence of the wage rate and working hours on life satisfaction. Holding the wage rate constant enables the utility effects of increasing working time to be analyzed independently of the earned wage. This direct effect denotes the non-pecuniary utility of work. Additionally, we can determine the trade-off between working time and wage rate. Using compensating variation, it is possible to calculate the hypothetical increase in the wage necessary to equal the utility loss following longer working hours. The question that can be answered is: "How much more do I have to pay the individual to keep him on the same utility level if he has to work one hour longer?". Hence, we determine the wage compensation for a change in labour time necessary to hold the utility level constant in order that the individual remains on the same indifference curve.

One could argue that working time is endogenous and individuals choose their optimal working time according to their individual optimization. If so, it would be not surprising that people who work longer are as satisfied as individuals who choose to work less. The first argument against this view is that working time is, in most cases, exogenously

predetermined by the employer due to mandatory contracts and regulations.[63] The employee can often only choose to take the job or not (here he has the opportunity to influence his working hours in line with his preferences). This weakens the argument, but is not completely conclusive. However, we have data available that show the optimal labour supply if the individual could freely choose his own working time. The GSOEP acquires information on the desired working time for every individual. This information can be seen as the workers' true preferences concerning their hours of labour supply. The desired working time equates with the individual's own decision to offer labour if the individual could freely decide and, hence, corresponds to the real individual labour supply. Using these data, I test a third hypotheses: namely, whether the non-pecuniary benefits of work still hold if we consider exogenously determined working time that the individual cannot influence himself. The appropriate estimation equation is:

$$LS_{it} = \alpha + \beta_1 W_{it} + \beta_2 \bar{Y}_{it} + \beta_3 L_{it} + \beta_4 L_{it}^2 + \beta_5 LWO_{it} + \beta_6 LWU_{it} + \sum_m \gamma_m X_{m,it} + \nu_i + \mu_t + \varepsilon_{it}. \quad (7)$$

Although the denotation of the variables is the same as before, I integrate two new generated variables, capturing the deviation of the real working hours from the individual desired working hours. The variable LWO_{it} is generated by

LWO_{it} = Real working hours a day - Desired working hours a day

for all individuals with higher real working hours than desired working hours. This variable, therefore, captures overemployment. The variable LWU_{it} is generated by:

LWU_{it} = Desired working hours a day - Real working hours a day

and takes into account all individuals with desired working hours exceeding real working hours, thus capturing underemployment. If the desired working time equals the real working time, both variables obtain the value zero. By calculation, both variables are always positive and higher values imply larger deviations from the individual's labour supply choice. Overall I have 132,130 individual observations with about 58 percent of individuals preferring to work less, and 17 percent preferring to work more, than they actually do. Only 25 percent of the employed can choose their labour time freely. This shows that working time is exogenously determined rather than endogenously. Including both variables in the regression allows us to control for the effect of endogenously chosen labour hours (LWU and LWO are equal to zero) and labour hours exogenously determined

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[63] We will see below that about 75 percent of the working population would prefer different working hours to those they in fact have. Hence, labour time is mostly exogenously given.

by the employer due to employment contracts or wage agreement provisions. Because we are using a fixed effects model, we are able to estimate the within-individual effects over time. Thus we can estimate how well-being is influenced if the individual freely chooses to work more or less or if working time is determined by the employer.

6. EMPIRICAL RESULTS

In the following section, the results of the three estimations are represented. I start with the first regression, analyzing if employment, as compared to unemployment, is positively related to life satisfaction. I estimated the regression using ordinary least squares with fixed effects to get a better perception of how strong the influences are and to obtain a better interpretation of the coefficient. Moreover, as Ferrer-i-Carbonell and Frijters (2004) show, the OLS fixed effects model provides essentially the same results as logit or probit models. Nevertheless, to take the ordinary nature of the endogenous variable into account and to control for the OLS results, I also estimate a conditional logit model with fixed effects recently developed by Ferrer-i-Carbonell and Frijters (2004). I chose this estimator because the fixed effect logit estimator developed by Chamberlain (1980) transforms the categorical life satisfaction scale into a binary variable by imposing one and the same cut-off level on all individuals. This method has the disadvantage of losing all observations of individuals who always report life satisfaction levels above or below this cut-off. The fixed effect logit estimator of Ferrer-i-Carbonell and Frijters (2004) avoids this shortcoming by imposing individual-specific cut-offs.

Table 3 represents the outcomes of the first specification broken down by gender.[64] The unemployment coefficient has the strongest negative impact of all variables in the OLS estimation as well as in the logit estimation with men suffering more from unemployment than women. Even if income were constant, so that the person could enjoy more leisure without reducing consumption, the person would nevertheless suffer from lower well-being. "Work" not only serves to earn a living, but also has additional, non-pecuniary benefits. This means, at the same time, that individuals gain positive utility if they supply labour.[65]

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[64] I refrain from presenting the coefficients of the control variables but concentrate on the main outcomes. The results are comparable with previous studies (see Frey and Stutzer (2002), Blanchflower and Oswald (2004), or Frijters et al. (2004)).

[65] This is even true in the case they would not earn more income at all than in the unemployed status.

Table 3: Regression results for life satisfaction

	Men		Women	
	OLS	Conditional Logit	OLS	Conditional Logit
	(1)	(2)	(3)	(4)
Employment status (reference: full-time employed)				
unemployed	-0.749***	-0.757***	-0.480***	-0.501***
	(0.026)	(0.045)	(0.030)	(0.048)
public job creation	-0.328***	-0.368***	-0.151**	-0.181*
	(0.066)	(0.109)	(0.064)	(0.103)
part-time	-0.210***	-0.246***	-0.083***	-0.071**
	(0.038)	(0.064)	(0.021)	(0.034)
self-employed	-0.136***	-0.202***	-0.102***	-0.038
	(0.032)	(0.053)	(0.037)	(0.060)
out of labour force	-0.197***	-0.163***	-0.018	0.076*
	(0.030)	(0.052)	(0.027)	(0.044)
Income				
net wage/1000	0.190***	0.293***	0.218***	0.313***
	(0.011)	(0.020)	(0.019)	(0.032)
remaining household income	0.068***	0.117***	0.070***	0.103***
	(0.007)	(0.014)	(0.006)	(0.011)
Family status (reference: single)				
living with a partner	0.204***	0.269***	0.248***	0.357***
	(0.025)	(0.042)	(0.028)	(0.045)
married	0.245***	0.381***	0.292***	0.377***
	(0.032)	(0.054)	(0.034)	(0.055)
divorced	-0.391***	-0.458***	-0.164***	-0.128*
	(0.044)	(0.076)	(0.044)	(0.070)
widowed	-0.334***	-0.318*	-0.470***	-0.388***
	(0.110)	(0.185)	(0.070)	(0.115)
Other variables				
household size	-0.054***	-0.100***	-0.102***	-0.061***
	(0.010)	(0.018)	(0.017)	(0.010)
age	-0.098***	-0.103***	-0.066***	-0.046***
	(0.006)	(0.011)	(0.006)	(0.010)
age^2	0.001***	0.001***	0.000***	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
number of children	0.056***	0.059***	0.054***	0.062***
	(0.012)	(0.020)	(0.012)	(0.019)
house ownership	-0.007	0.039	0.055***	0.135***
	(0.019)	(0.032)	(0.020)	(0.032)
relative in need of care	-0.337***	-0.337***	-0.340***	-0.378***
	(0.043)	(0.072)	(0.041)	(0.067)
years of education	-0.026***	-0.031***	0.013*	0.022**
	(0.007)	(0.011)	(0.007)	(0.011)
Individual Fixed Effects	yes	yes	yes	yes
R^2 / log likelihood	0.06	-36,997	0.04	-39,223
Observations	83,732	78,685	87,396	82,420

*Note: OLS Fixed Effect and Conditional Fixed Effect Logit estimations with individual fixed effects and time fixed effects. Standard deviations in parentheses. * denotes significance at the 10-percent level, ** at the 5-percent level and *** at the 1-percent level.*

The estimated coefficient for the net wage is positive and highly significant: a higher net wage increases life satisfaction for both sexes. Interestingly, the impact is much stronger than the influence of the remaining household income. That is surprising because one would expect that a higher net wage would be accompanied by strenuous and hard work, which would diminish the positive income effect. The remaining household income is mostly exogenously given and independent of one's own efforts. Hence we would expect it to lead to a stronger well-being effect. That is not the case. It seems that there are some status effects so that individuals with a higher net wage also experience a higher status that increases life satisfaction. Another explanation may be that a larger share of the own net wage, in comparison to the household income, can be spend by the individual themselves.

As a first result we can sum up that individuals experience a utility increase (under constant income) due to a positive labour supply. To get a more detailed analysis, I now turn to the estimation results regarding different working hours. Table 4 summarizes the results of the second specification, which includes individual working hours a day. To avoid any bias, I only consider all working individuals in a permanent job with strictly positive working time. Working hours have a highly significant, positive influence on life satisfaction for men in both specifications ($\beta_3 > 0$). A look at the coefficients of the OLS estimation shows that one working hour would increase life satisfaction by 0.078 points. However, this influence is non-monotonic. In fact, it has a well defined hill-shaped form because the square of working hours has the expected negative sign ($\beta_4 < 0$), which countervails the positive influence. More working hours increase well-being up to a specific level and decrease life satisfaction afterwards. The point where the optimal life satisfaction level in relation to working hours is reached is 7.7 hours a day for men using both the OLS result and the conditional logit result. Longer working hours decrease well-being. The picture is quite different for women. Working hours still have a positive influence and working hours squared a negative impact but both are not significant. The optimal working time for women is 4.2 hours (3.6 hours).[66] It should be recalled that, due to our control variables, these results are independent of income. Consider two identical men with the same income. The person that works 7.7 hours is happier than the person working less than 7.7 hours.

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[66] Interestingly, the OLS and the condition logit estimation yield the same relative results for men and nearly equal results for women. This confirms the result of Ferrer-i-Carbonell and Frijters (2004).

Table 4: Regression results for life satisfaction including working time

	Men		Women	
	OLS (5)	Conditional Logit (6)	OLS (7)	Conditional Logit (8)
Working time a day				
working hours	0.078***	0.104***	0.018	0.018
	(0.013)	(0.023)	(0.013)	(0.022)
working hours^2	-0.005***	-0.007***	-0.002**	-0.003
	(0.001)	(0.001)	(0.001)	(0.002)
Income				
net wage/1000	0.193***	0.329***	0.257***	0.395***
	(0.011)	(0.023)	(0.023)	(0.042)
remaining household income	0.056***	0.115***	0.068***	0.110***
	(0.008)	(0.016)	(0.008)	(0.015)
Family status (reference: single)				
living with a partner	0.178***	0.275***	0.281***	0.412***
	(0.028)	(0.052)	(0.034)	(0.059)
married	0.252***	0.407***	0.237***	0.325***
	(0.035)	(0.063)	(0.041)	(0.072)
divorced	-0.456***	-0.563***	-0.102*	-0.110
	(0.048)	(0.090)	(0.052)	(0.091)
widowed	-0.211	-0.369	-0.457***	-0.329**
	(0.128)	(0.236)	(0.087)	(0.152)
Other variables				
household size	-0.063***	-0.121***	-0.071***	-0.116***
	(0.011)	(0.021)	(0.013)	(0.023)
age	-0.069***	-0.080***	-0.065***	-0.058***
	(0.007)	(0.013)	(0.008)	(0.014)
age^2	0.000**	0.001***	0.000**	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
number of children	0.031**	0.035	0.033**	0.046*
	(0.013)	(0.024)	(0.015)	(0.026)
house ownership	0.021	0.079**	0.045*	0.137***
	(0.020)	(0.036)	(0.024)	(0.042)
relative in need of care	-0.190***	-0.286***	-0.043	-0.144
	(0.050)	(0.089)	(0.061)	(0.104)
years of education	-0.006	0.002	0.014	0.044**
	(0.009)	(0.017)	(0.011)	(0.020)
R^2 / log likelihood	0.03	-28,507	0.03	-22,402
observations	66,976	61,515	54,243	48,910

Note: OLS Fixed Effect and Conditional Fixed Effect Logit estimations with individual fixed effects and time fixed effects. Standard deviations in parentheses. * denotes significance at the 10-percent level, ** at the 5-percent level and *** at the 1-percent level.

This result does not confirm the general assumption of labour disutility (at least until the inflection point), but on the assumption of an average working man, or woman, working 8.83, or 6.73, hours a day, respectively, we indeed find marginal disutility of work. Therefore, the results support the neoclassical assumptions of marginal labour disutility. But, at the same time, work and working time do indeed generate, in total, positive non-pecuniary benefits for men and, in a weaker form, for women.

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Again, there are strong gender differences if we consider the employment status and working time. One reason for the shorter optimal labour time for women could lie in the household work that women do in addition to their employment. Women have significantly shorter working hours, but if we view the time spent in the household or on family care as labour time, there is no significant difference in aggregate working hours between men and women. Another explanation for the differences could be a social norm effect. Men might be more satisfied with longer working hours because the social norm is to work full-time. Women, in contrast, do not have this distinct social custom and it is more socially acceptable to work shorter working hours.

Using the results in Table 4, one can now calculate the necessary net wage compensation for one working hour to keep the individual as equally satisfied as before. The results depend on the mean working time due to the non-monotonic influence of working hours. The net wage compensation K is calculated with:

$$K = \frac{\beta_3 + 2\beta_4 L}{\beta_1} \cdot 1000 \ . \tag{8}$$

The numerator captures the marginal well-being effect of working time and the denominator, the marginal effect of a wage increase.[67] The results in Table 5 show the net well-being effect of an increase in working hours for men.[68] As can be seen, the optimal working time is between seven and eight hours, as mentioned above. The following examples will help to clarify the interpretation. If the working time of a man rises from 3 to 4 hours a day, well-being increases by 0.0375 points. In the hypothetical case of a man increasing his working time from one hour to eight hours, the well-being change is the sum of the net effects, i.e. 0.192 points. However, a man who is already working 12 hours a day would experience a well-being decrease of 0.0427 if he had to work one hour more a day. He would need a net wage compensation of about 11 euro per hour. This corresponds to a wage premium of about 34 percent in comparison to the average hourly net wage of 8.28 euro for men working 12 hours a day in the sample.

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[67] Due to the use of the variable net wage/1000 in the regression, it is necessary to multiply the effects by 1000.

[68] Only the calculations for men are presented due to the insignificant estimation coefficients for women. The well-being effects turn negative for women after about four hours. If we consider the medium working time for women, which is about seven hours a day, an increase of one hour leads to a change of well-being of -0.012.

Table 5: Well-being effects of working hours and net wage compensation (OLS results)

| | Men | |
Working Hours a Day	Net Well-Being Effect	Net Wage Compensation in euro
1	0.0676	-17.5
2	0.0576	-14.9
3	0.0475	-12.3
4	0.0375	-9.7
5	0.0275	-7.1
6	0.0174	-4.5
7	0.0074	-1.9
8	-0.0026	0.7
9	-0.0127	3.3
10	-0.0227	5.9
11	-0.0327	8.5
12	-0.0427	11.1
13	-0.0528	13.7
14	-0.0628	16.3
15	-0.0728	18.9
16	-0.0829	21.4

Note: Net wage compensation is the net wage necessary to compensate the individual
for one more working hour to keep him as equally satisfied as before the increase.

Aggregate utility of work

Using the estimation results, the total utility effect of work can be examined. Figure 5 shows the aggregated non-pecuniary utility effects of work. The total impact is positive for men up to a working time of about 14 hours a day. A man who is working 14 hours a day is still better off than a man who is not working at all. The findings for women are quite different. The aggregated utility of work is substantial less than for men and turns negative at about 7.5 hours. The results indicate that an average man (mean working time: 8.83 hours) as well as woman (mean working time: 6.73 hours) gains positive total utility from work whereas the marginal utility is negative.

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Figure 5: Non-Pecuniary Utility of Work: Life Satisfaction Change and Working Hours
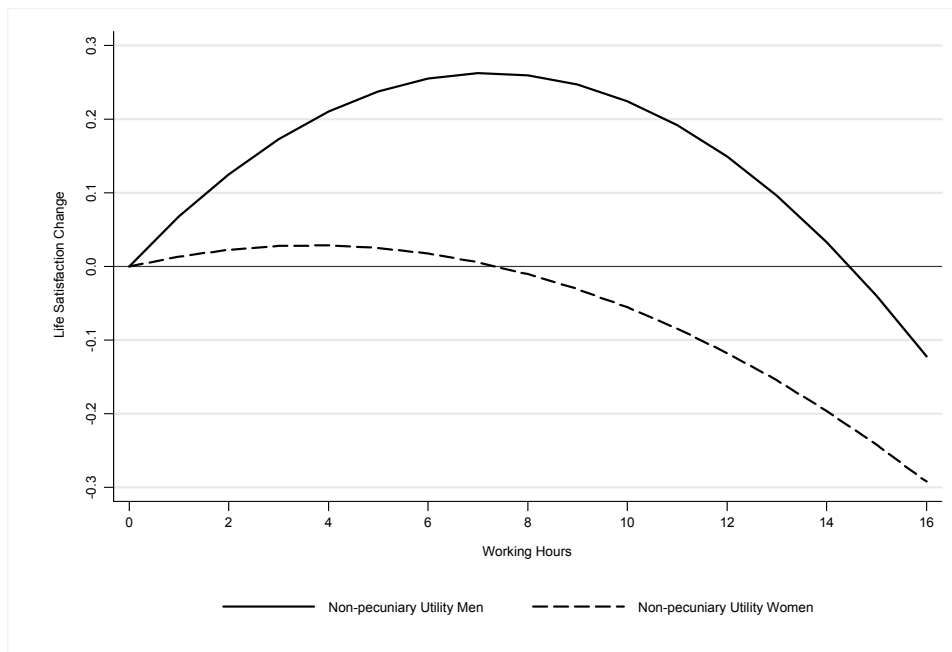
7. EXOGENOUS VS. ENDOGENOUS WORKING TIME

So far we have not distinguished whether working time is exogenous or endogenous. It could be argued that employees can at least partly determine their labour supply. If working time is endogenously determined, individuals can choose their optimal labour hours according their preferences. Consequently, a positive correlation between chosen working hours and life satisfaction is driven by the rational decision to offer the preferred hours of work. The true individual labour supply is, however, not observable. Nevertheless the GSOEP questionnaire provides a solution because it asks respondents for the time they would like to work if they could freely choose. The answers can be seen as the workers' true preferences concerning their hours of labour supply. Thus we are able to detect mismatches between real working time and true preferred labour supply. To control for the mismatches, I now consider the third estimation including variables for overemployment and underemployment.

Table 6 represents the results of the extended estimation. Most of the conclusions of the former regressions still hold. Working hours are again significantly positive for men, but the size of the effect is reduced in comparison to the preceding estimation. This is caused by the explicit consideration of the exogenous changes in the working time. If people

freely chose their working hours, the positive effect should diminish because individuals would now optimize according to their preferences.

Table 6: Regression results for life satisfaction including working hours and preferences

	Men		Women	
	OLS (1)	Conditional Logit (2)	OLS (3)	Conditional Logit (4)
Working time a day and deviation from preferred working time				
working hours	0.052*** (0.016)	0.064** (0.030)	0.026* (0.014)	0.029 (0.025)
working hours^2	-0.003*** (0.001)	-0.004** (0.002)	-0.001 (0.001)	-0.001 (0.002)
overemployment	-0.025*** (0.005)	-0.035*** (0.010)	-0.033*** (0.007)	-0.052*** (0.011)
underemployment	-0.015** (0.007)	-0.022* (0.012)	0.004 (0.003)	0.005 (0.006)
Income				
net wage/1000	0.189*** (0.012)	0.316*** (0.024)	0.231*** (0.024)	0.341*** (0.044)
remaining household income	0.050*** (0.008)	0.107*** (0.017)	0.069*** (0.008)	0.105*** (0.016)
Family status (reference: single)				
living with a partner	0.169*** (0.030)	0.263*** (0.054)	0.281*** (0.036)	0.420*** (0.062)
married	0.238*** (0.036)	0.392*** (0.066)	0.242*** (0.043)	0.361*** (0.075)
divorced	-0.466*** (0.050)	-0.559*** (0.094)	-0.102* (0.054)	-0.081 (0.095)
widowed	-0.215 (0.135)	-0.411 (0.252)	-0.473*** (0.091)	-0.332** (0.161)
Other variables				
household size	-0.061*** (0.012)	-0.114*** (0.022)	-0.064*** (0.014)	-0.106*** (0.024)
age	-0.070*** (0.007)	-0.074*** (0.014)	-0.059*** (0.008)	-0.049*** (0.015)
age^2	0.000** (0.000)	0.001*** (0.000)	0.000 (0.000)	0.000 (0.000)
number of children	0.029** (0.013)	0.035 (0.025)	0.031** (0.016)	0.043 (0.027)
years of education	0.029 (0.021)	0.082** (0.038)	0.040 (0.025)	0.134*** (0.044)
house ownership	-0.189*** (0.052)	-0.285*** (0.094)	-0.072 (0.064)	-0.193* (0.109)
relative in need of care	-0.006 (0.009)	0.005 (0.017)	0.018 (0.012)	0.046** (0.021)
R^2 / log likelihood	0.04	-25,597	0.03	-20,069
observations	61,738	56,119	49,998	44,635

*Note: OLS Fixed Effect and Conditional Fixed Effect Logit estimations with individual fixed effects and time fixed effects. Standard deviations in parentheses. * denotes significance at the 10-percent level, ** at the 5-percent level and *** at the 1-percent level.*

The square of working hours is negative and significant. Hence, well-being is influenced positively by an increase in the first working hours and negatively if the rise occurs while the labour time is already high. We turn now to the variables that indicate the deviation from the individually preferred labour time. Both overemployment and underemployment have the expected negative sign. Deviations from the preferred working time decrease well-being significantly. Interestingly, the negative effect is stronger if employees work too long. One hour more than the preferred working time leads to a fall in life satisfaction of 0.025 points for men whereas the well-being decrease due to underemployment is only 0.015 points. As the results show overemployment is a likewise unfavourable condition for women and has a highly significant influence. A deviation from the preferred working time leads to a strong decline in individual well-being but only if they work too much. Underemployment on the other hand does not have a significant impact on life satisfaction of women.

8. CONCLUSION

Standard economic theory assumes disutility effects caused by work at the margin whereas the economic happiness literature points to positive non-pecuniary effects of employment. This article investigates the relationship between working hours and individual well-being. The findings obtained from our empirical analysis suggest a more differentiated view. Increasing working hours lead to a rise in individual life satisfaction even if income is held constant. This finding is an indicator that work is a positive source of utility and suggests that employment and working time increase happiness. The change in status from unemployed to employed alone leads to a substantial enhancement of well-being even if the time spent at work represents only very few hours. Furthermore, men benefit from increasing labour hours due to non-monetary utility. The optimal labour supply for maximizing well-being is around seven hours a day. Increasing working time further leads to a reduction in happiness. As is the case with men, women benefit from the non-pecuniary utility of work but reach the optimal labour time after only about four hours a day, with decreasing impact afterwards. Since the happiness maximizing labour time is lower than the average real working time for both sexes, the neoclassical assumption of marginal labour disutility is supported. At the margin, labour does indeed cause disutility for the majority of the employed but the total utility of work is, as the happiness literature suggests, positive rather than negative. These results bring the theory assumptions in line

with the empirical findings of the well-being research and find support for both. Moreover, they show that the assumptions of the neoclassical theory are compatible with the empirical happiness results.

The analysis of exogenous changes of working time that lead to over- or underemployment shows a similar picture. Working hours still generate positive utility effects but exogenous deviations from the preferred labour time lead to a strong decrease in well-being. In particular, working more than preferred appears to have a substantial diminishing influence.

Not only is work a necessity to generate income for consumption but it also generates positive non-monetary utility effects. This is a reassuring finding for the ongoing debate in happiness economics and the question whether we should focus more on leisure time than on work. As long as individuals do not work excessive hours, labour even increases well-being, whereas too much leisure time affects life satisfaction negatively. The economic policy implications are obvious. The main interest should lie in reducing unemployment. Here policy could improve the well-being via two channels – an increase in income for consumption and a rise in the non-pecuniary utility of work. Mandatory restrictions regarding working hours, in contrast, decrease individual welfare because, if determined by outsiders, they do not in most of the cases correspond to the individually preferred labour time. If this is the case, people experience a drop in well-being due to over- or underemployment. It is not restrictions, but more flexible working time that can increase happiness and workers welfare. Particular companies could benefit from flexible working hours and a good working environment. Because the non-pecuniary utility can be seen as a substitute to wages, companies can attract employees even with lower wages than their competitors but have to pay for this wage discount with more flexible working hours and an improvement in their working conditions.

APPENDIX CHAPTER 2

In the main part of this paper, we have shown how monetary equivalents of a single event (such as an unemployment spell) can be calculated if we take the intertemporal effects of income compensations into account. It is, of course, also conceivable that the event, for which the monetary compensation is to be calculated, itself has intertemporal effects on life satisfaction. In our particular case, Clark et al. (2001) show that the life satisfaction of a person that has experienced unemployment in the past but has returned to employment in the meantime will still be lower than that of a continuously employed person. This is the "scarring" effect of unemployment. If such a negative intertemporal effect is present, the monetary amount that would have to be paid to compensate a person for the loss in life satisfaction from unemployment would have to be larger than without the "scarring" effect.

To incorporate this intertemporal effect of unemployment, we extend the life satisfaction equation (1) by including a measure of past unemployment experience. We follow Clark et al. (2001) who apply the share of time a person has been unemployed in the last three years (*PASTUE*) to capture the "scarring" effect. Hence, we estimate the following life satisfaction equation:

$$LS_{it}^* = \alpha + \beta_1 \ln Y_{it} + \beta_2 \ln \overline{Y}_i + \beta_3 UE_{it} + \beta_4 PASTUE_{it} + \gamma X_{it} + v_i + \mu_t + \varepsilon_{it}. \qquad (A.1)$$

The resulting compensation scheme has to distinguish between three different time intervals. In the first interval of length τ (in years), the person is unemployed, suffers from the loss in well-being β_3, and receives the compensation payment κ_{UE}. To fully restore the life satisfaction the person would have had without unemployment, κ_{UE} is determined by the same condition (6) as in the main text:

$$-\beta_3 = \beta_1 \kappa_{UE} + \beta_2 \frac{\Delta \overline{Y}_i}{\overline{Y}_i}. \qquad (A.2)$$

In the second time interval, the person suffers from the "scarring" effect of past unemployment even after he has returned to employment. In this time, his life satisfaction is reduced by β_4 times the share of τ in the last three years (as assumed by construction of *PASTUN*), but the person also benefits from the increase in permanent income already

experienced through κ_{UE}. To balance both effects, the person receives a (potentially negative) compensation κ_{PASTUE} during these three years. This compensation is given by

$$-\beta_4 \frac{\tau}{3} = \beta_1 \kappa_{PASTUE} + \beta_2 \frac{\Delta \overline{Y}_i}{\overline{Y}_i} \ . \tag{A.3}$$

The third time interval refers to the post-scarring period. In our specification, previous unemployment spells do not affect current well-being after the third year of reemployment. The persisting positive well-being effect of the increased permanent income, however, has to be countered by a negative compensation κ_E, which brings the level of well-being back to that of a continuously employed person. The condition determining κ_E is the same as condition (7) in the main text:

$$0 = \beta_1 \kappa_E + \beta_2 \frac{\Delta \overline{Y}_i}{\overline{Y}_i} \ . \tag{A.4}$$

The change in permanent income induced by the compensation scheme $\left(\kappa_{UE}, \kappa_{PASTUE}, \kappa_E\right)$ can be approximated by

$$\frac{\Delta \overline{Y}_i}{\overline{Y}_i} = \frac{\tau}{h} \kappa_{UE} + \frac{3}{h} \kappa_{PASTUE} \frac{h - \tau - 3}{h} \kappa_E \ , \tag{A.5}$$

where h is the individual's time horizon during which the increase in permanent income is effective for well-being. The "net" compensation κ is then given by

$$\kappa = \kappa_{UE} + \frac{3}{\tau} \kappa_{PASTUE} + \frac{\left(h - \tau - 3\right)}{\tau} \kappa_E \ . \tag{A.6}$$

Solving the system of equations (A.2)-(A.6) yields:

$$\kappa = -\frac{3\left(1-\tau\right)\beta_2\left(\beta_3 + \beta_4\right) + h\left(\beta_1 \tau \left(\beta_3 + \beta_4\right) - \left(1-\tau\right)\beta_2 \beta_4\right)}{h\beta_1\left(\beta_1 + \beta_2\right)} \ . \tag{A.7}$$

If we want to calculate the compensation for an unemployment spell that lasts exactly one year ($\tau = 1$), (A.7) simplifies to

$$\kappa = \frac{-\left(\beta_3 + \beta_4\right)}{\beta_1 + \beta_2} \ . \tag{A.8}$$

Equation (A.8) shows that the intertemporal effects of unemployment can be taken into account when calculating the compensation amount by dividing the sum of the coefficients of past and current unemployment by the sum of the coefficients of transitory and permanent income.

Table A.1 presents the regression results of estimating equation (A.1). Current unemployment exerts a negative influence on life satisfaction. We also find some evidence for the "scarring" effect of unemployment. Past unemployment reduces the life satisfaction for the employed. For the unemployed, however, no such effect is present. This means that we do not find evidence for a habituation effect (for which the coefficient would have to be positive), but also not for an aggravated negative effect of long-term unemployment. Table A.2 contains the results of applying the compensation equation (A.8) to these data. As can be seen by comparing Tables 3 and A.2, taking the "scarring" effect into account increases the non-pecuniary costs of unemployment. In the extended model, men would have to receive a compensation of 138 percent of their initial income, while the compensation for women would be 70 percent.

Table A.1: Regression results (including past unemployment)

	both sexes		men only		women only	
	(1)	(2)	(3)	(4)	(5)	(6)
	truncated	extended	truncated	extended	truncated	extended
employment status (reference: full-time employed)						
unemployed	-0.594**	-0.598**	-0.715**	-0.720**	-0.466**	-0.462**
	(0.025)	(0.025)	(0.034)	(0.034)	(0.036)	(0.036)
past unemployment						
unemployed	0.007	0.017	0.001	0.016	-0.023	0.008
	(0.045)	(0.047)	(0.066)	(0.066)	(0.062)	(0.066)
employed	-0.241**	-0.227**	-0.350**	-0.314**	-0.172**	-0.154**
	(0.049)	(0.049)	(0.074)	(0.074)	(0.065)	(0.066)
income						
ln(transitory income)	0.356**	0.267**	0.384**	0.298**	0.345**	0.242**
	(0.015)	(0.016)	(0.021)	(0.023)	(0.021)	(0.022)
ln(permanent income)		0.556**		0.452**		0.650**
		(0.031)		(0.043)		(0.043)
log likelihood	-121,863	-121,711	-58,332	-58,277	-63,397	-63,288
observations	76,902	76,902	37,392	37,392	39,510	39,510

*Note: Ordered probit estimation with individual random effects and time fixed effects. Personal controls include marital status, number of children, years of education, out of labour force, an interaction term between past unemployment and out of labour force, age (and age squared), living in owned accommodation, and having a household member in need of care. Standard errors in parentheses. * denotes significance at the 5-percent-level, ** at the 1-percent-level.*

Table A.2: Non-pecuniary costs of unemployment (including past unemployment)

	both sexes	men only	women only
truncated model	234.6 %	277.3%	184.9%
extended model	100.2 %	137.9%	69.1 %

Note: The values are expressed relative to individual income.

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