UNEMPLOYMENT AND HEALTH:

AN ANALYSIS BY MEANS OF BETTER DATA

AND IMPROVED METHODOLOGY.

vorgelegt von

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When I first saw unemployed men at close quarters, the thing that horrified and amazed me was to find that many of them were *ashamed* of being unemployed... At the time nobody cared to admit that unemployment was inevitable, because this meant admitting that it would probably continue. The middle classes were still talking about 'lazy idle loafers on the dole', and saying that 'These men could all find work if they wanted to', and naturally these opinions percolated to the working class themselves.

GEORGE ORWELL, *The Road to Wigan Pier*

What do I eat? Eggs, chips, and beans and meat only on Sundays. I never go out, never see any friends, only ever see a convener from another plant who sometimes calls me up. Sometimes I think my brain is dying. I get depressed-sometimes I shout and bawl. I'm not going mental, but I feel I might like to damage somebody...

What do I do with my time? Well, there's the garden, but I'm not a gardener, I'm not going to garden for victory yet. I do nothing. I've got the tools you'd need for anything, but I never touch them. It's very difficult to get motivated. I've got a lot to do, like redoing the kitchen, but I can't.

A middle aged former machine tool engineer quoted in *Wigan Pier Revisited* by

BEATRIX CAMPBELL

ACKNOWLEDGEMENTS

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INTRODUCTION

Unemployment rates have been increasing in Germany in the last years. The rate of registered unemployment in 1988 was 6,2%[1] while in 2001 it was 10,0%[2].

This tendency is not changing. In June 2003 the rate of unemployment in West-Germany was 8,1%, which represents an increase of 7,3% with respect June of last year. For East-Germany the unemployment rate in June was 18,3%, which represents an increase of 17,5%[3].

Therefore, unemployment and policies orientated to reduce these growing rates have become one of the main concerns of the German government.

One of the factors that contribute to the present situation in the German labour market is the current unfavourable macroeconomic situation. However, there is consensus about the necessity of performing structural reforms in the German labour market.

One of the critics of the present situation is the *excessive* protection offered by the state to individuals who remain long-term unemployed.

The argument is that due to the long duration of the financial support that unemployed receive, after job loss individuals don't feel the pressure to find a job immediately. As a result, the period of unemployment increases leading to undesirable rates of long-term unemployment. According to this argument, a reduction in the period to which individuals have the right to receive financial support will have positive effects on reemployment.

In this direction, the German government has proposed to reduce the maximal duration of the period to which individuals have the right to receive unemployment subsidy[4]. According to this proposal, from January 2004, unemployed older than 55 would receive unemployment subsidies a maximum period of 18 months, while currently individuals older than 57 are entitled to receive unemployment subsidy up to 32 months. For younger individuals, the maximum duration of unemployment subsidies would be reduced to 12 months.

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[1] Source: EUROSTAT.
http://www.europa.eu.int/comm/eurostat
[2] Source : LABORSTA. Labour statistics database operated by the ILO Bureau of Statistics.
http://laborsta.ilo.org/
[3] Source: Bundesanstalt für Arbeit.
http://www.arbeitsamt.de/hst/services/statistik/index.html
[4] http://www.bundesregierung.de/artikel,-482898/Verkuerzung-der-Bezugsdauer-vo.htm

These measures are designed to incentive job search in order to avoid long-term unemployment But, what do we really know about the situation of the individuals who remain for long-term unemployed?

Are they really individuals who don't want to work? or are they individuals who were in the past active in the labour market and they see now helpless how their chances to find again a place in the labour market decrease as the time goes by?

It is not possible to draw a clear picture. Probably for some long-term unemployed, unemployment subsidies really act as a disincentive in a new job search. However, for other unemployed (specially for older individuals) who can not change their situation because employers are not willing to hire them, unemployment subsidy does not play a role in the determination of the duration of the unemployment experience.

For individuals who remain involuntarily unemployed, inactivity may have an effect on their well-being. First, they face financial difficulties. And furthermore, they are confronted with the loss of self-esteem derived from the lack of perspectives in a society in which work is one of the main key stones.

In the literature there can be found a lot of statements of this situation resulting in mental health problems, and with the time in physical health problems. However, solid empirical evidence is rare. Most of the empirical studies carry out cross-sectional analysis. This structure does not allow to distinguish whether the correlation between unemployemnt and ill-health is caused by the negative effect of unemployment on health or whether individuals with poor health are more likely to become unemployed.

In the present study we analyse the health situation of employed as well as unemployed persons. With the use of the German Socio-Economic data set we answer the following questions: Does individuals health worsen after job loss? Does individuals health improve when they are reemployed? Is there a difference in the effect on health if the individual is short- or long- term unemployed? Do long-term unemployed accommodate to their situation? Which are the stressors and moderators of the effect of unemployment on health? Do women suffer less from unemployment than men? Which is the role played by the labour status of the partner?

This analysis helps us to have a clearer picture of what being unemployed means in terms of health. We analyse the effect of unemployment on health satisfaction which is a subjective indicator of health. Subjective indicators of health include physical and psychological health aspects. We analyse the physical and psychological situation of individuals who are unemployed.

One of the main objectives of the empirical analysis is to see whether or not the effect on health changes as the duration of unemployment increases. If the situation worsens with the time, the individual does not accommodate to his situation. But if health improves as the period of unemployment increases, there would be evidence of adaptation.

In the first chapter we review the most influencing theories (Jahoda, Warr) which explain how unemployment affects health. Next, we review recent studies which analyse the effect of unemployment on health and well-being. These studies have been classified in cross-sectional and longitudinal studies.

Longitudinal studies solve better the main methodological problem of this analysis: the endogenous relationship between unemployment and health. This endogenous relationship derives from two sources:

- There is a reverse causal relationship between these two variables. While unemployment may have an effect on health, poor health may lead to job loss.

- Furthermore, individual unobserved factors may be associated with both the likelihood of involuntary job loss and health status.

In the second chapter, we analyse the health indicator used in the empirical analysis: health satisfaction. We first point out the advantages of using subjective health indicators and next we review recent studies which analyse the correlation between subjective and objective health indicators. Finally, we use the response model developed by Kerkhofs and Lindeboom to evaluate the responses to the question *how satisfied are you with your health?* in the GSOEP questionnaires.

In the third chapter, we review the health production function framework. Concretely, we review the models developed by Auster, Grossman, Rosenzweig and Schult, Kenkel and Cantoyannis and Jones. These models were developed to offer a theoretical framework in the analysis of the relationship between health inputs and health outputs.

In the fourth chapter we analyse the empirical relationship between unemployment and health satisfaction making use of the longitudinal structure of the GSOEP. We first analyse descriptively the relationship between health satisfaction and labour status. Next, in the multivariate analysis we use three different models to analyse the effect of short and long term unemployment and reemployment on health satisfaction.

CHAPTER 1
EVIDENCE OF THE RELATIONSHIP BETWEEN UNEMPLOYMENT AND HEALTH

1. Does unemployment and reemployment affect health?

As we pointed out in the introduction, the objective of the present study is to analyse the relationship between unemployment and health.

The starting point for this analysis is the review of the theories which explain how unemployment affects health. From these theories we learn the mechanisms through which health may be affected by unemployment and reemployment.

In this section we review the models proposed by Jahoda and Warr, since they are very comprehensive theories which explain how (un)employment affects health.

Jahoda's functional model explains the negative effect of unemployment on health by arguing that employment has some latent functions (a part from the financial remuneration) and unemployed individuals are deprived from these benefits.

Warrs' vitamin model explains the negative effect of unemployment on mental health using the argument that the environment in which individuals are involved suffers a deterioration after job loss.

Furthermore, we review other theories (Freud, Erikson, Marmot) which explain the reasons why work is so important as determinant of health.

Finally, we describe the stages model which explains the phases which unemployed go trough after job loss.

1.1. The functional model

Jahoda[5] suggests that there are some functions which are inherent to employment. A part from the manifest function of employment (financial remuneration) there are some latent functions. She argues that employment:

- Imposes time structure of the day,
- Implies regularly shared experiences and contact with others,
- Links an individual to goals and purposes which transcended his/her own,
- Defines aspects of personal status and identity,
- Enforces activity.

The individual who is unemployed suffers from the absence of these latent functions. His mental health is affected because there are some needs which are not covered.

For Jahoda it is not the economic strain what provokes an impoverishment in the individuals' mental health. Rather, it is the absence of employment by which the individual covers his basic psychological needs[6].

Jahoda also suggests that leisure can not be an alternative to employment because it doesn't offer an alternative to employment in the sense that the latent functions are not accomplished by leisure[7].

Jahoda's functional theory does not account for the possibility of an improvement in mental health when quitting a dissatisfying job. This is, for Jahoda unemployment is always worse than employment whatever the characteristics of the job, and reemployment is always better than remaining unemployed.

Jahoda's does not offer neither an explanation of why there exists variations from individual to individual in effects of unemployment on mental health.

1.2. The vitamin model

Under Warr's view[8], mental health is assumed to be influenced by the environment in a manner analogous to the effect of vitamins on physical health. The availability of vitamins is important for physical health up to but not beyond a certain level. At low levels of intake, vitamin deficiency gives rise to physiological impairment and ill-health, but after attainment of specified levels there is no benefit derived from additional quantities.

Warr suggests that the principal environment features of employment are important to mental health in a similar manner: their absence tend towards an impairment in mental health, but their presence beyond a required level does not yield further benefit.

The features of the environment selected by Warr are nine. These determinants of mental health are:

- Opportunity for control. The environment of the unemployed offers less opportunities to control activities and events. Therefore, they have a smaller scope for making decisions.

- Opportunity for skill use. At work is where most of the individuals can develop new skills and apply old ones. The opportunity for skill use is a source of satisfaction which unemployed can not use.

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[5] Jahoda M. (1982) *Employment and unemployment*. Cambridge University Press. Cambridge.

[6] Ezzy D.(1993) Unemployment and mental health: a critical review. *Soc.Sci.Med*. vol.37(1), 41-52.

[7] Ezzy D.(1993) Unemployment and mental health: a critical review. *Soc.Sci.Med*. vol.37(1), 41-52.

[8] Warr, P. (1987) *Work, Unemployment and Mental Health*. Oxford University Press: New York.

- Externally generated goals. The unemployed have a lack of goals determined by the environment. They don't have the same obligations and targets as when they were employed, they don't have the same role. Warr[9] suggest that "role-generated requirements give rise to organised sequences of actions, in which specific targets and their overall structure provide 'traction' which draws people along".
- Variety. Unemployed have more restricted behaviours and environments.
- Environmental clarity. Unemployed have lower predictability of the consequences of their actions. They have also lower predictability about other people in the environment and therefore they cannot foresee the reaction to some of their actions. Furthermore it is not clear for them the normative expectations about their behaviour.
- Availability of money. Most unemployed suffer from financial worries and this can give rise to many processes likely to impair mental health.
- Physical security. This issue is related to the previous one: availability of money. When shortage of money is extreme the individuals can be physically threatened. These happens for example when the financial resources of the individual are not enough to cover the family housing requirements.
- Opportunity for interpersonal contact. Unemployed suffer a reduction in the number and usually in the quality of interpersonal contacts.
- Valued social position. Unemployed suffer a decline in social position. Even when the unemployment rates are high, the status of the unemployed is low.

Warr's model explains the negative impact of unemployment by arguing that there is an impoverishment in the environment of the unemployed.

In the frame of this model, differences in mental health among different groups of unemployed can be explained by the differences in environments of these groups. This is, unemployment does not affect all individuals in the same way, since there may be differences between groups in all the features of environment presented above.

The vitamin model, also accounts for the possibility of having a positive effect of loosing a job when this job is dissatisfying. When the environment of the dissatisfied worker is affecting negatively his mental health, there can be a benefit of loosing his job. For the same reason, there can be a negative effect when being reemployed in a dissatisfying job.[10] It can happen that after reemployment the environment is not better for the individual, and therefore the individual does not obtain any benefit from reemployment.

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[9] Warr, P. (1987) *Work, Unemployment and Mental Health*. Oxford University Press: New York
[10] Ezzy, D. (1993) Unemployment and mental health: a critical review. *Soc.Sci.Med*. vol.37(1), 41-52.

1.3. What do we learn from Warr's and Jahodas' models.

These models are a good starting point to understand how unemployment may affect health and which are the factors that intervene in the relationship between these two variables.

Taking these theories as a base and with the help of the empirical analysis, it can be developed a clearer understanding about the moderators and stressors that intervene in the relationship between unemployment and health.

In the empirical analysis this idea is reproduced by the introduction of interaction effects between unemployment and other variables. An illustrative example is the interaction effect between 'being unemployed' and 'social support'. Social support is expected to reduce the impact of unemployment through the coverage of some of the latent functions of employment introduced by Jahoda, and through the improvement of the environment of the individual (Warr's theory).

Trough the introduction of interaction effects we can also identify which are the groups which may be more affected by unemployment. Warr in his theory accounts for the possibility of differences in the effect of unemployment between groups, whereas Jahoda doesn't.

In the empirical analysis this can be tested by introducing interaction effects between unemployment and some characteristics of the individual, such as age or education. In this way we can test whether or not there are age or education groups which are especially affected by unemployment.

Warr's model also accounts for the possibility of a positive effect from losing a dissatisfying job. And for the possibility of a negative effect from being reemployed in a dissatisfying job. The idea is that the individual who was not at all satisfied with his job may not be affected by unemployment in the same way as a person who was completely satisfied with his job. In the same way, individuals who are reemployed in a dissatisfying job may not be recovered in the same way as people who are reemployed in a satisfying job.

1.4. Other theories

There are other theories which explain how health may be affected by labour status. These theories, like the ones of Jahoda and Warr, help us to understand better the mechanisms through which health is affected by unemployment.

Freud claimed that work ties us to reality. The routine is what avoids that we create 'new problems' due to the fact that we dispose of too much free time: "If we are not obliged to get up in the morning and apply our selves to a job then we are in danger of being overwhelmed by fantasy or emotion. The unemployed broken hearted adolescent has time to dwell on her problems, while the girl working in the post office has to concentrate on her work"[11].

Erikson[12] is the founder of the life span developmental theory. An individual's healthy psychological ego development depends on successful completion of each stage of human development. Concretely, a healthy transition from adolescence to adulthood is contingent upon the attainment of a desirable occupational identity. Therefore Erikson would expect lack of success in the labour market to diminish an individual's sense of worth.

Marmot[13] followed the health status of thousands of civil servants over almost two decades. He concluded that there is *something* that powerfully influences health and that is correlated with hierarchy per se. Is this notion of hierarchy (economic power, political authority and social position) what is important in determining the health of the unemployed.

The stages model is also helpful for the present analysis. This model explains the phases which unemployed go through when quitting their job: "First there is shock, which is followed by an active hunt for a job, during which the individual is still optimistic and unresigned; he still maintains an unbroken attitude. Second, when all efforts fail, the individual becomes pessimistic, anxious, and suffers active distress; this is the most crucial state of all. And third, the individual becomes fatalistic and adapts himself to his new state but with a narrower scope"[14].

In the fourth section of the present chapter, we review some studies which analyse the evolution of the dependent variable (health) through time in order to test adaptation.

In the empirical analysis presented in following chapters, we test whether or not such an adaptation occurs. We analyse whether or not the effect of unemployment varies with the time, and whether long term unemployed suffer an adaptation process.

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[11] Smith, R. (1985) What's the point. I'm no use to anybody: the psychological consequences of unemployment. *British Medical Journal* vol. 291.

[12] Goldsmith A.H., Veum J.R. & Darity W.Jr. (1996) The impact of labour force history on self-esteem and ist component parts, anxiety, alienation, and depression. *Journal of Economic Psychology* 17, 183-220.

[13] Shortt S.E.D. (1996) Is unemployment pathogenic? A review of current concepts with lessons for policy planners. *International Journal of Health Services* vol.26(3), 569-589.

[14] Eisenberg and Lazarsfeld in Ezzy D. (1993) Unemployment and mental health: a critical review. *Soc.Sci.Med.* vol.37(1), 41-52.

2. Review studies

In this section we review the main recent studies which classify the existing literature dealing with the relationship between unemployment and health.

This review allow us to obtain an overview of the main conclusions given in the literature about the relationship between these two variables.

Most of the studies, classify the literature depending on which variables the studies relate: Unemployment and morbidity, unemployment and mortality, unemployment and mental health, etc. Some studies also distinguish between some methodological aspects: aggregate studies, plant closure studies, individual studies.

We review these classifications, and in the following section we offer an alternative to the ones reviewed here.

Wilson and Walker[15] offer a review of studies which analyse the effect of unemployment on different health measures. The authors were asked to prepare this review by the authorities of the Trent Region in the UK after the closure of a large number of coal mines and the subsequent increase of unemployment in this region.

The authors suggest that the main explanation for the relationship between unemployment and health is that unemployment is often inextricably combined with other social disadvantages. Unemployment is a very important factor in the development of social deprivation.

The authors conclude that it is demonstrated in the literature that unemployed and their wives have an increased mortality. There is also an increased perinatal mortality and infant mortality in their children. They conclude also that there is little evidence to support the maintenance of psychological well-being in both the short- and long- term unemployed.

Another important conclusion is about the effects of unemployment on family life: the authors suggest that a higher proportion of unemployed parents are registered as families with a child at risk of abuse. Furthermore, unemployed families are reported as having a high incidence of wife battering and domestic violence[16].

Suicide and parasuicide (attempted suicide) seem to be more common among the unemployed, specially for those people living in areas of multiple deprivation. Depression and neurosis seem to be also higher for unemployed and their families.

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[15] Wilson S.H. & Walker G-M. (1993) Unemployment and Helath a Review. *Public Health*, 107, 153-162.
[16] Wilson S.H. & Walker G-M. (1993) Unemployment and Helath a Review. *Public Health*, 107, 153-162.

In terms of physical morbidity, the authors conclude that there is a significant increase in general practitioners consultations for unemployed and their families.

Another important finding from one of the reviewed studies[17] is that there is an anticipatory effect of job loss. This is, if the individual knows that there is a certain risk of loosing his job, there can be a certain effect on his health. It is also suggested that in systems like the NHS where there is no cost to the patient at the point of service, the individuals are not inhibited from seeking help.

There is not a clear evidence of which are the effects of unemployment on alcohol and cigarette consumption.

The authors also conclude that although financial security is an important factor in promoting health it is not the only factor in trying to reduce the effects of unemployment. They defend positive interventions to reallocate unemployed, as well as some interventions to encourage preventive care.

Hollederer[18] also concludes that bigger efforts should be done in order to avoid that long-term unemployed fall in a 'circulus vitiosus'. Long-term unemployed suffer from health deterioration which makes difficult their re-entrance in the labour market. Therefore, reemployment in the first months of unemployment should be promoted.

Short[19], in his study reviews what the literature tell us about the effects of unemployment on mortality, morbidity, mental health of women, families and young persons. The author also reviews briefly time-series and plant-closure studies.

Short, as Wilson and Walker[20], concludes that unemployment accounts for at least some increase in mortality rate.

From his review of the existing literature, the author concludes that there is a certain adverse effect on physical and mental health. He also concludes that there is a pathological impact of unemployment on the children and families of the unemployed.

Short suggests that most of the studies are focused exclusively on males. However, from the few studies that also include women it is clear that most women suffer some adverse mental and physical effects from unemployment. This conclusion is also valid for young

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[17] Beale N. & Nethercott S. (1987) The health of industrial employees for years after compulsory redundancy. *Journal of Royal College of General Practitioners*, 37, 390-394.

[18] Hollederer A. (2002) Arbeitslosigkeit und Gesundheit. Ein Überblick über empirische Befunde und die Arbeitslosen- und Krankenkassenstatistik. *MittAB* 3/2002.

[19] Shortt S.E.D. (1996) Is Unemployment Pathogenic? A review of current concepts with lessons for policy planners. *International Journal of Health Sevices*, vol.26, number 3, 569-589.

[20] Wilson S.H. & Walker G-M. (1993) Unemployment and Helath a Review. *Public Health*, 107, 153-162.

individuals. Short concludes that it is clear that adolescents and young adults experience both physical and especially mental ill-health as a result of unemployment[21].

From the time-series studies, the author reviews basically M. Harvey Brenner's work[22]. Brenner uses aggregate time series analysis to analyse the relationship between changes in economic indicators and changes in health status.

The main health indicators used are age- and sex- specific mortality, cardiovascular mortality, deaths from cirrhosis of the liver, suicide rates, and rates of first admission to mental hospitals. And the main economic indicators used in Brenner's work are trends in per capita income, inflation, and unemployment.

Brenner concludes that ill-health is strongly related to unemployment, for each of the national experiences analysed. He argues that unemployment affects health in the following ways[23]:

- Unemployment engenders poverty, a state which in turn implies poor nutrition, low housing standards, and, in the United States, impaired access to health care.

- Unemployment creates psychological stress, a documented etiological factor in numerous disorders including cardiovascular disease.

- Unemployment may provoke inappropriate coping techniques such as alcohol abuse, increased tobacco consumption, or illicit drug use, each of which is linked to morbidity.

The main critic to Brenner's work is that he does not demonstrate that there exists a causal relationship between the chosen variables. He shows correlations between these variables, but this does not demonstrate causality. "Correlation does not imply causation"[24].

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[21] Shortt S.E.D. (1996) Is Unemployment Pathogenic? A review of current concepts with lessons for policy planners. *International Journal of Health Sevices*, vol.26, number 3, 569-589.
[22] Brenner M.H. (1977) Health costs and benefits of economic policy. *International Journal of Health Sevices*, vol. 7, 581-623.
Brenner M.H. (1979) Mortality and the economy: A review, and the experience of England and Wales, 1936-1976. *Lancet* ii:568-573.
Brenner M.H. & Mooney A. (1983) Unemployment and health in the context of economic change. *Soc. Sci. Med.*.17, 1125-1138.
Brenner M.H. (1987) Relation of economic change to Swedish health and social well-being, 1950-1980. *Soc. Sci. Med.*.25, 183-195.
Brenner M.H. (1987) Economic change, alcohol consumption and heart disease mortality in nine industrialized countries. *Sci. Med.*.25, 119-132.
[23] Shortt S.E.D. (1996) Is Unemployment Pathogenic? A review of current concepts with lessons for policy planners. *International Journal of Health Sevices*, vol.26, number 3, 569-589.
[24] Heckman J.L. (1999) *Causal parameters and policy analysis in economics: a twentieth century retrospective*. NBER WP 7333.

Other habitual critic made to aggregate studies is that they can make valid statements only at macro level but at lower levels is not possible not confirm these statements.

Gravelle et al. also criticised that in Brenner's work unemployment has not been adequately shown to stand alone and separate in its relationship to ill-health from variables such as income, occupational education or housing[25].

Given the critics to Brenner's work, Ruhm[26] examines how health status and medical care utilization fluctuate with state macroeconomic conditions by using microdata from the National Health Interview Surveys.

The main results are that there is a countercyclical variation in physical health, while there is some evidence that mental health is procyclical. The countercyclical variation is particularly strong for persons of prime working age, employed individuals and men.

Short[27], concludes that future studies should try to concentrate on micro-level analysis. Plant-closures studies are micro-level analysis focused on the consequences on health of the individuals after the announcement of the closure of a plant.

These studies are of special interest because workers are assumed not to be 'guilty' for the closure, and they are assumed to be healthy before the closure being announced. However, these studies have also some limitations. Most of them follow relatively small numbers of employees over short time spans and have difficulty finding truly comparable control groups[28].

Jin et al.[29] review the evidence supporting an association between unemployment and ill-health. The results were evaluated on a epidemiological basis. The authors assess the findings according to the epidemiological criteria for causation. This criteria takes into account the following aspects: temporal direction, strength of association, dose-response relation, consistency of findings, experimental evidence, specificity, analogy and biological plausibility.

A part from the influence of unemployment on morbidity, mortality, suicide, alcohol consumption and use of mental and general health care services, the authors review

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[25] Gravelle H., Hutchinson G., & Stern J. (1981) Mortality and unemployment: a critique of Brenner's time-series analysis. *Lancet* ii: 657-679.
[26] Ruhm C.J. (2001) Economic expansions are unhealthy: Evidence form microdata. *NBER* WP 8447.
[27] Shortt S.E.D. (1996) Is Unemployment Pathogenic? A review of current concepts with lessons for policy planners. *International Journal of Health Sevices*, vol.26, number 3, 569-589.
[28] Shortt S.E.D. (1996) Is Unemployment Pathogenic? A review of current concepts with lessons for policy planners. *International Journal of Health Sevices*, vol.26, number 3, 569-589
[29] Jin R.L., Shah C.P. & Svoboda T.J. (1995) The impact of unemployment on health: a review of the evidence. *Canadian Medical Association Journal*, 153(5).

briefly the existing literature that analyses the links between unemployment and deaths due to motor vehicle accidents.

From the results of two studies carried out in Canada and in the United States[30], it can be concluded that there is not a positive correlation between unemployment levels and rates of fatalities in motor-vehicle accidents.

Goldney[31] reviews ten studies examining the influence of unemployment in cardio-vascular disease. The author argues that since none of these studies present a longitudinal structure, it is not possible to confirm the direction of causality from the positive associations reported in the studies.

Murphy & Athanasou[32] make a review of recent studies that investigate the effect of unemployment on mental health. The sixteen studies included met the following criteria:

(1) The use of standardised psychological tests as measures of the dependent variable.

(2) Conducted with a longitudinal design.

(3) Published in the last 10 years in English-language scientific journals.

After the analysis of several studies which meet these criteria, the authors conclude that individuals who have lost their job have worse health than the employed individuals who have been taken as comparison group.

The longitudinal design of the studies allow the authors obtain conclusions about the direction of the causality. They suggest that the fact that distress falls after reemployment implies that job loss provokes psychological distress, rather than the reverse. However, they suggest that the issue of selection bias is not trivial and review briefly how the considered studies try to overcome this problem.

The authors also estimate the effect size of the effect of unemployment on mental health. They combined the results and effect sizes associated with the individual studies to arrive to an approximation of the effect size across the analysed studies. The results suggest that moving from unemployment to employment not only produces a reliable change in mental health but a change which is 'practically' significant[33].

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[30] Adams O.B. (1981) Health and economic activity: a time-series analysis of Canadian mortality and unemployment rates. *Health Division, Statistics Canada*, Ottawa.
Leigh J.P. & Waldon H.M. (1991) Unemplooyment and high-way fatalities. *J Health Polit Policy Law*, 16, 135-155.
[31] Goldney R.D. (1997) Unemployment and health: a re-appraisal. *Int. Arch. Occup. Environ. Health* 70, 145-147.
[32] Murphy G.C. & Athanasou (1999) The effect of unemployment on mental health. *Journal of Occupational and Organizational Psychology*, 72, 83-99.
[33] Murphy G.C. & Athanasou (1999) The effect of unemployment on mental health. *Journal of Occupational and Organizational Psychology*, 72, 83-99.

Schwefel[34] reviews the existing literature in German-speaking countries. In his review, a part from including the studies which analyse the influence of unemployment of health, he includes studies that analyse other important aspects that have to be taken into account given the complicated relationship between these two variables.

Schwefel suggests that the relation between unemployment and health is not trivial:

- employment may lead to illness,
- illness may lead to unemployment,
- unemployment may lead to illness,
- unemployment may lead to health.

For this reason, the author reviews literature which deals with aspects such as illness and the entry into unemployment, illness and the duration of unemployment and illness and the reintegration of the unemployed.

Schwefel also reviews studies which are concentrated on specific 'problem groups'. The effect of unemployment is not the same for all the individuals. It is interesting for policy reasons, to identify the groups who suffer more when they are unemployed.

The author reviews the literature which identifies the following problem groups: social and mental problem groups, unemployed youth, unemployed women, unemployed white-collar workers, unemployed elderly, children of the unemployed and short-time workers.

Schwefel summarises the main results from the reviewed literature as follows:

- Unemployment and overwork can induce similar psychosomatic impairments.
- The unemployment effects in the 30s are different from the unemployment effects in the 70s. The effects of unemployment in the 30s had to do more with impoverishment. Unemployed individuals in the 30s suffered physical deprivation. In the 70s and nowadays, unemployment has more psychological than physical burdens.

In his article, Schwefel[35] also makes some policy recommendations. The main recommendations made by de author are:

- Creation of new jobs, fair distribution of work and working hours, economic relief for the deprived and overburdened, minimisation of physical and mental impairments caused by employment as well as unemployment.
- Case-oriented social policies.
- Training programs.

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[34] Schwefel D. (1986) Unemployment, health and health services in German-speaking countries. *Social Science and Medicine*, vol.22 (4), 409-430.
[35] Schwefel D. (1986) Unemployment, health and health services in German-speaking countries. *Social Science and Medicine*, vol.22 (4), 409-430.

One of the most complete reviews has been carried out by Kasl & Jones[36]. A part from reviewing the studies which analyse the impact of unemployment and retirement on several health indicators, the authors also review some conceptual and methodological issues in studies of job loss.

They make a very comprehensive review of the studies which deal with the effect of unemployment on mortality and physical morbidity, on biological and behavioural risk factors and on mental health and well-being.

The authors also review the literature about the impact of job insecurity and threatened job loss, and the impact of retirement.

However, the most interesting point (since it is a new aspect) is that the authors analyse the conceptual and methodological issues in studies of job loss. In past review studies there was not such a deep analysis of methodological issues.

Kasl & Jones conclude that the main methodological issue of the literature is the distinction between causation and selection: "Does the observation of poorer physical and mental health reflect the impact of unemployment or does it, instead, denote the influence of prior characteristics of the individual who later become unemployed?"[37].

They suggest that the evidence supports both the causation and the selection interpretations, and that the two interpretations are not incompatible. This is the issue that has mainly determined the design of the studies that analyse the impact of unemployment on health and well-being.

The first distinction made by Kasl & Jones among the different study designs is whether the study is based on aggregated or individual data.

Next, they distinguish between controlled randomised programs and observational (non-experimental) studies. The usual design is the second one, this is observational studies, both longitudinal and cross-sectional.

They classify the longitudinal studies in three types of designs:

- Natural experiments. Which typical example is a plant or factory closure study.
- Longitudinal comparisons of the employed and unemployed. It is however, difficult to obtain the right data for such longitudinal comparisons. The authors suggest that the design is rather weak when no baseline data are available on health and social characteristics of the two cohorts.

[36] Kasl S. & Jones B.A. (1998) *The impact of job loss and retirement on health*. In Social Epidemiology. Berkman L.F. & Kawachi I. eds. Oxford University Press.

[37] Kasl S. & Jones B.A. (1998) *The impact of job loss and retirement on health*. In Social Epidemiology. Berkman L.F. & Kawachi I. eds. Oxford University Press.

- Follow-up of the unemployed to detect benefits of re-employment.

Kasl & Jones suggest that cross-sectional designs normally cannot distinguish whether if unemployment causes poor health (causation hypothesis) or if it is poor health what causes unemployment (selection hypothesis). There may be self-selection processes which can not be controlled for using a cross-sectional design.

The authors summarise the conclusions of the reviewed studies in the following points[38]:

- Unemployment appears to be associated with about a 20%-30% excess total mortality in most studies.

- The impact of unemployment on physical morbidity is also evident, but the results are more variable and more difficult to interpret.

- Biological indicators of stress reactivity and disease risk provide rather good evidence of their acute sensitivity to some aspect of the unemployment experience (including anticipation) but chronic elevations in relation to enduring unemployment are infrequently documented.

- Behavioural and life style risk factors, such as smoking or exercise, show sporadic evidence of impact, as well as considerable complexity of findings: some of these variables seem implicated in selection rather than causation.

- Unemployment clearly increases psychological distress, particularly symptoms of depression, but overt diagnosable disorders are probably not elevated. The increases in distress seem reversible upon re-employment.

- A variety of indicators of physical and psychological morbidity and cardiovascular risk are likely to show adverse effects under conditions of heightened job insecurity. High community levels of unemployment have a negative impact on depressive symptoms of employed individuals (urban setting), an effect which can be interpreted as that due to threatened job loss.

Smith[39] (1985) published a serie of articles in the British Medical Journal in order to aware doctors of the powerful effect that unemployment has on ill-health. The articles

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[38] Kasl S. & Jones B.A. (1998) *The impact of job loss and retirement on health*. In Social Epidemiology. Berkman L.F. & Kawachi I. eds. Oxford University Press.

[39] Smith R. (1985) „Bitterness, shame, emptiness, waste": an introduction to unemployment and health. *British Medical Journal*, vol.291, 1024-1027.

Smith R. (1985) „Gissa job": the experience of unemployment. *British Medical Journal*, vol.291, 1263-1266.

Smith R. (1985) „What's the point. I'm no use to anybody": the psychological consequences of unemployment. *British Medical Journal*, vol.291, 1338-1341.

Smith R. (1985) „I feel really ashamed": how does unemployment lead to poorer mental health. *British Medical Journal*, vol.291, 1409-1412.

were published in the 80s, when there was high unemployment in England. In this period the interest on the consequences of unemployment grew and lead to the publication of such a series.

In each article, the author reviews one important issue of the relationship between unemployment and health.

First, Smith describes the experience of unemployment. He suggests that unemployment benefits are usually not enough and therefore long term unemployed may lead to poverty. Smith also suggests that there is an effect of unemployment on alcohol, cigarette and illicit drug use. At the same time, there is an effect on the proportion of unstructured to structured time.

In another article, the author reviews the evidence of the effects of unemployment on the family members of the unemployed individual. The author argues in these articles that there is evidence of the negative effect of unemployment on health of the family members.

In a later article[40] Smith makes recommendations about which measures should be carried out in order to reduce the effects of unemployment on mental health. He makes recommendations to the government, to other national agencies (such as the British Medical Association, the Royal College of Nursing, the Health Visitors Association, the Health Education Council and the Scottish Health Education Group) and to doctors in general.

Goldsmith et al.[41] (1996) review the literature which relates unemployment and self-esteem. They conclude that there is not consensus about the impact of unemployment on self-esteem. They suggest that this is due to some methodological problems of the considered studies which have not been solved till the moment of the review.

The three statistical problems that Goldsmith et al. suggest are: omitted variables, unobserved heterogeneity and data selection.

Smith R. (1985) „He never got over losing his job": death on the dole. *British Medical Journal*, vol.291, 1492-1495.

Smith R. (1985) „I couldn't stand it any more": suicide and unemployment. *British Medical Journal*, vol.291, 1563-1566.

Smith R. (1985) „I'm just not right": the physical health of the unemployed. *British Medical Journal*, vol.291, 1626-1629.

Smith R. (1985) „We get on each other's nerves": unemployment and the family. *British Medical Journal*, vol.291, 1707-1710.

[40] Smith R. (1986) Improving the health of the unemployed: a job for health authorities and health workers. *British Medical Journal*, vol.292, 470-472.

[41] Goldsmith A.H., Veum J.R., Darity W. (1996) The impact of labor forcr history on self-esteem and ist components parts, anxiety, alienation, and depression. *Journal of Economic Psychology* 17, 183-220.

In their paper they present a new estimation of the relationship between unemployment and self-esteem and try to overcome the methodological problems found in the reviewed literature. In the following section we will analyse their methodology and results.

3. Cross-sectional and Longitudinal Studies

Most of the review articles analysed in the last section, classify the studies using the dependent variable as criteria. The studies are classified depending on the variable on which unemployment has an effect: on morbidity, on mortality, on suicide, on visits to the General Practitioner, on alcohol and cigarette consumption, on traffic accidents, etc.

In this section, the studies are classified depending on their structure in cross-sectional and longitudinal studies.

This classification is important if we take into account which is the main methodological problem in the analysis of the relationship between unemployment and health: the endogeneity between these two variables.

The endogenous relationship between unemployment and health derives from two sources[42]:

- There is a reverse causal relationship between these two variables. This is, unemployment may lead to a reduction in health, and at the same time, declines in health may lead to involuntary job loss.

- Individual unobserved factors may be associated with both the likelihood of involuntary job loss and health status.

If these aspects are not taken into account biased results may be obtained. In order to overcome the endogeneity problem, panel data structure is more adequate than cross-sectional structure.

The use of panel data provides two major benefits for estimation[43]:

- Eliminates estimation bias due to unmeasured heterogeneity. In a panel data design, it is controlled for the non-observable factors by introducing into the equation an individual effect (constant through time) and by using the right estimation method to overcome the problem of correlation between these individual effects and other explanatory variables.

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[42] Gallo W.T., Bradley E.H., Siegel M. & Kasl S.V. (2000) Health effects of involuntary job loss among older workers: findings from the health and retirement survey. *Journal of Gerontology: SOCIAL SCIENCES* 55B(3), S131-S140.
[43] Carrasco R. (2002) Estimation of dynamic discrete choice models for panel data. PACO Training Session. Luxemburg June 2002.

- Introduces dynamic structure in the model. The dynamic structure is important in order to overcome the problem of reverse causality. In longitudinal models, by defining the right temporal sequence, the direction of causality can be identified.

Due to these aspects the study structure is very important. Therefore, in the present review the studies are classified in cross-sectional and longitudinal studies. First, the problem of reverse causality is analysed deeper.

3.1. Causation and selection hypothesis: are they mutually exclusive?

The proportion of persons with health problems among the unemployed is likely to be higher than among the general population[44]. There are two general hypothesis to explain this phenomenon:

- Causation thesis: unemployment causes health problems.
- Selection thesis: individuals with health problems are more likely to be fired from their work.

The most probable solution is that both hypotheses are true in a way. This is, the relation between unemployment and health is not trivial, and probably both directions of the causal relationship play an important role. However, most of the studies are interested in testing one of the directions of this relationship. Concretely, most of the literature has tested the causation hypothesis.

When testing this hypothesis it is important to take into account that ill-health has also a certain effect on the probability of being unemployed, in order to avoid having biased estimates.

The literature gives a wide variety of solutions to this problem. The most *practical* point of view, is the one from Smith[45] (1985). Smith argues the following: '...but we should not, I think, become too obsessed with trying to work out whether poor health or unemployment comes first because either way it adds up to a great many people in poor health not having jobs'.

Although he is right in the sense that the result is the same whatever the explanation, it is important to know which are the causes in order to overcome the problem with the design of the right policy tools.

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[44] Arrow J.O. (1994) The influence of health on unemployment in Germany: a duration model. *DIW-Vierteljahresbericht. Hefte für Wirtschaftsforschung*, 1333-138. Berlin.
[45] Smith R. (1985) ‚He never got over lossing his job': death on the dole. *British Medical Journal* 291, 1492-1495.

Therefore, some effort has to be done in order to analyse deeply the relationship between these two variables.

Authors like Winkelmann & Winkelmann[46] and Elkeles & Seifert[47] analysed the problem of double directionality of the causality in the relationship between unemployment and health.

One of the main lessons of these studies is that the use of panel data helps to understand better the endogenous relationship between these variables.

When using cross-sectional data for testing such a causal relation, it is difficult to infer the direction of causation. In a cross-sectional study that tests the causation hypothesis, if there are individuals who lost their job due to their ill-health, this effect will be falsely interpreted as an effect of unemployment on health.

Furthermore, the presence of unobserved common determinants of health and unemployment may lead to a spurious correlation, or omitted variable bias[48].

Panel data solves better the problem of the reverse causality due to the dynamic structure, and furthermore, with repeated observations for the same individual it is possible to control for unobserved, but time-invariant, individual specific effects that are correlated with unemployment[49].

Elkeles & Seifert[50] test both hypotheses (causation and selection) with longitudinal analyses. They select individuals who were unemployed for at least six months prior to the survey dates and who were employed the preceding year. And compare several health indicators at time of unemployment with the same health indicators in the preceding year when the individuals were employed.

The authors suggest that if the causation hypothesis is true, one would expect that the health of the unemployed would deteriorate with respect to the time when they were employed. And if the selection hypothesis is true, an improvement or at least stability would be expected.

Their conclusion is that independently of the level of health satisfaction before the loss of employment, no overall deterioration occurred after loss of employment.

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[46] Winkelmann L. & Winkelmann R. (1998) Why are the unemployed so unhappy?. *Economica* 65, 1-15.
[47] Elkeles T. & Seifert W. (1993) Unemployment and health imairments. Longitudinal analyses for the Federal Republic of Germany. *European Journal of Public Health*, vol.3 (1), 28-37.
[48] Winkelmann L. & Winkelmann R. (1998) Why are the unemployed so unhappy?. *Economica* 65, 1-15.
[49] Winkelmann L. & Winkelmann R. (1998) Why are the unemployed so unhappy?. *Economica* 65, 1-15.
[50] Elkeles T. & Seifert W. (1993) Unemployment and health imairments. Longitudinal analyses for the Federal Republic of Germany. *European Journal of Public Health*, vol.3 (1), 28-37.

Elkeles & Seifert also analyse the transition from unemployment into employment. They suggest that though health satisfaction of the re-employed did not improve, it was at a quite high level. This supports the idea that healthier persons are more likely to be re-employed than individuals with poor health. They conclude therefore that the poorer health of the unemployed can be explained as a consequence of selection processes.

Arrow[51],[52] criticises the study of Elkeles & Seifert. The main points of his critic are that the sampling design for testing selection hypothesis is inappropriate, and that they base their conclusions on descriptive statistics only.

In order to test the selection hypothesis, the author analyses the health effects of the duration of the employment/unemployment spell. Concretely, he focuses on the question: under what conditions does bad health constitute a risk to employment?.

He uses for the analyses Cox partial-likelihood regressions and he concludes that the hypothesis that bad health constitutes a risk to employment is not true. But for groups who are vulnerable in the labour market (foreigners and female workers) chronic illness or a long absence from work for health reasons is positively associated with the risk of unemployment[53].

Stewart[54] analyses the impact of health status on the duration of the unemployment spells. She first analyses the impact of impaired health on the duration of unemployment spells using a duration analysis framework.

The results show that impaired health significantly increases the length of unemployment spells.

A as conclusion the author points out that this selection bias effect has to be taken into account when measuring the impact of unemployment on health status.

3.2. Cross-sectional studies

As pointed out in past sections, cross-sectional designs don't solve satisfactorily the problem of endogeneity between unemployment and health.

However, there are several studies which use this design, and try to solve the question of the possible reverse causality with extra tools.

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[51] Arrow J.O. (1996) Estimating the influence of health as a risk factor on unemployment: a survival analysis of employment durations for workers surveyed in the GSOEP. *Soc. Sci.Med*. 42(12), 1651-1659.
[52] Arrow J.O. (1994) The influence of health on unemployment in Germany: a duration model. *DIW-Vierteljahresbericht*, 1333-138. Berlin.
[53] Arrow J.O. (1994) The influence of health on unemployment in Germany: a duration model. *DIW-Vierteljahresbericht*, 1333-138. Berlin.

Theodossiou[55] uses data from the BHPS (British Household Panel Study) for his cross-sectional study which analyses the effect of low-pay and unemployment on psychological well-being. He uses logistic regressions[56] which relate the categorical dependent variables (six different measures of mental distress) to the individual's employment status and other personal and work experience characteristics.

The way in which Theodossiou intents to solve the problem of the double direction of causality is by choosing the questions concerning *recent* changes in individuals' psychological state. The author argues that in this way the individuals who are included in the study suffer changes in psychological status due to their employment status rather than the contrary.

The results of the study show that unemployment has negative psychological consequences on the individual, and that these consequences are stronger for individuals who are unemployed than for individuals who have a low-pay employment.

Clark & Oswald[57] use also data from the BHPS for the analysis of the relationship between unemployment and happiness. The question which the authors want to answer is whether or not individuals are choosing to be unemployed.

They first analyse descriptively the data, correlating employment and unemployment with the level of mental distress.

Next, Clark & Oswald estimate ordered probit equations. They regressed individual's well-being on a set of personals characteristics.

One of the most surprising features of this study is that, although the authors contemplate the problem of reverse causality, they don't solve this methodological problem. They just refer to a summary by Warr, Jackson & Banks[58] which sets the direction unemployment-unhappiness.

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[54] Stewart J.M. (2001) The impact of health status on the duration of unemployment spells and the implications for studies of the impact of unemployment on health status. Journal of Health Economics 20, 781-796.

[55] Theodossiou I. (1998) The effects of low-pay and unemployment on psycological well-being: a logistic regression approach. *Journal of Health Economics* 17, 85-104.

[56] A *k*-category ordered logistic model is used:

$$\log(p_i / 1 - p_i) = a_i + b' x \qquad i = 1,2,...,k\text{-}1$$

where p_i is the probability of being assigned to one of the categories $i+1$, $i+2$,...,k; x is a vector of independent variables, b is a vector of logistic coefficients. The intercepts a_i vary between categories and satisfy the constraints $a_1 \leq a_2 \leq ... \leq a_{k-1}$.

[57] Clark A.E. & Oswald A.J. (1994) Unhappiness and unemployment. *The Economic Journal* 104, 648-659.

[58] Warr P.B., Jackson P.R. & Banks M. (1988) Unemployment and mental health: some British studies. *Journal of social issues*, vol.44, 47-68.

The main conclusion is that being jobless is significant and negatively correlated with well-being, therefore, individuals do not chose to be unemployed.

Other important conclusion of this study is that long time unemployed show less distress than those who recent lose their jobs. This implies a certain adaptation of the individual to his situation.

Hamilton, Merrigan & Dufresne[59] analyse the relationship between mental health and unemployment by using simultaneous equations. They contemplate the endogenous relationship between these variables, and characterise this interrelation by using simultaneous equations. They applied a maximum likelihood, simultaneous equation generalised probit, and concluded that there is an endogenous relationship between employment and mental health: higher values of employment are associated with improved mental health, and improved mental health is also associated with a higher index of employability.

Rodríguez[60] in his study, analyses the relationship between marginal employment and self-rated health using German and English data. He uses a logistic regression in which the outcome variable is divided into two groups, one including reports of good or excellent health and the other including fair, bad or very bad health.

In order to control for a possible reverse causation effect, the model included adjustments for previous health status. In addition, in order to control for previous experience with job instability, the model included previous unemployment.

3.3. Longitudinal studies

In this section we review several studies which use a longitudinal design in order to overcome the problem of endogeneity between labour status and health. As introduction to this review, we present in the following section an overview of the main advantages of working with longitudinal data.

3.3.1. Advantages of using longitudinal designs

A part from making possible to account for unobserved individual heterogeneity and for dynamics as we saw above, there are other advantages of working with panel data over the cross-sectional studies[61].

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[59] Hamilton V.H., Merrigan P. & Dufresne E. (1997) Down and out: estimating the relationship between mental and unemployment. *Health Economics* vol.6, 397-406.

[60] Rodríguez E. (1999) Marginal employment and health in Germany and the UK: does unestable employment predict health? *Wissenschaft Zentrum Berlin* DP FS I 99-203.

[61] Mátyás L. & Sevestre P. (eds.) (1992*) The Econometrics of Panel Data*. Kluwer Academic Publishers: The Netherlands.

First, the number of observations is much larger, which is likely to produce more reliable parameter estimates. At the same time, allows the researcher to specify and test more sophisticated models. It also alleviates the problem of multicollinearity, when explanatory variables vary in two dimensions they are less likely to be highly correlated.

Summarising, a part from controlling better for the two sources of endogeneity (reverse causality and non-observed effects), panel data has other advantages which make this structure the most desirable one for this kind of analysis.

3.3.2. Review of longitudinal studies

We first present an overview of the paper written by Twisk[62]. In this paper, the author summarises the main longitudinal models used in the estimation of epidemiological relations, and proposes an estimation method for these models.

Twisk presents four different longitudinal models, which are limited to fixed-effects models and which characteristics are presented in table 1.

The author suggests that in most of the cases a combination of different models can be the best way in answering a particular epidemiological question.

For the estimation of these models, Twisk recommend the use of GEE (Generalised Estimating Equations). With GEE, the relations between variables of the model at different time points are tested simultaneously. A pooled analyses of cross-sectional (between subjects) and longitudinal (within subjects) relationships is carried out. Therefore, the standardised regression coefficient combines the between-subject and the within-subject into one coefficient[63]. Another important advantage of GEE compared to the maximum likelihood approaches is that GEE is suitable for the analysis of both continuous and discrete variables.

And the greatest disadvantage is that the method does not provide any information on how well the model fits the data.

Winkelmann & Winkelmann[64] use data from the first six waves (1984-90) of the GSOEP in order to test whether unemployed individuals are satisfied or dissatisfied with their lives in relation to individuals out of the labour force and employed individuals, and in

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[62] Twisk J.W.R. (1997) Different statistical models to analyze epidemiological observational longitudinal data: an example from the Amsterdam growth and health study. *Int. J. Sports Med.* 18, S216-S224.

[63] Twisk J.W.R. (1997) Different statistical models to analyze epidemiological observational longitudinal data: an example from the Amsterdam growth and health study. *Int. J. Sports Med.* 18, S216-S224.

[64] Winkelmann L. & Winkelmann R. (1995) Unemployment: where does it hurt? *Centre for Economic Policy Research* DP. 1093.

Winkelmann L. & Winkelmann R. (1998) Why are unemployed so unhappy? Evidence from panel data. *Economica* 65, 1-15.

order to establish the size of non-pecuaniary costs of unemployment relative to the pecuniary costs.

They first carry out a descriptive analysis of the data. In this first analysis, the authors, analyse satisfaction means for the different employment status. They also analyse changes in satisfaction and changes in labour status.

Winkelmann & Winkelmann conclude from this descriptive analysis that there is a decrease in satisfaction for individuals who were employed and are now unemployed, and there is also an increase in satisfaction for people who were unemployed and are now employed. The authors suggest that this symmetric effects support the causation hypothesis.

Another interesting conclusion is that for individuals who went out of the labour force the effect on life satisfaction was lower than for the individuals who went into unemployment. There is little variation in the life satisfaction indicator for the individuals who remained unemployed. This means, that individuals did not get used to their status.

For the econometric analysis of the relationship between employment status and life satisfaction, Winkelmann & Winkelmann use a limited dependent panel model, after reducing the dimension of the explined variable into satisfied/dissatisfied dichotomy. They obtain logit estimates for five different models:

- First model is a standard logit regression for pooled data.
- The second model, is the fixed effects logit model.
- The third and the fourth, explore the robustness of the fixed effects logit results under modified specifications.
- The last model introduces age-specific effects of unemployment and leaving the labour market.

When comparing the pooled logit model with the fixed effects model the authors conclude[65]:

- The fixed effect model is the better model.
- The detrimental effect of unemployment on satisfaction persists after fixed effects are taken into account.

They also conclude that the non-pecuniary costs of unemployment by far exceed the pecuniary costs.

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[65] Winkelmann L. & Winkelmann R. (1995) Unemployment: where does it hurt? *Centre for Economic Policy Research* DP. 1093.
Winkelmann L. & Winkelmann R. (1998) Why are unemployed so unhappy? Evidence from panel data. *Economica* 65, 1-15.

Goldsmith et al.[66] analyse the relationship between unemployment and self-esteem controlling for different methodological problems.

They first review cross-sectional and longitudinal studies which link self-esteem and unemployment. The conclusion of this review is that the relationship between these two variables is unclear. Goldsmith et al. suggest that the failure of a consensus it is due to the methodological problems of the reviewed studies.

These statistical problems are basically three:

- Omitted variable bias. By stratifying the data (usually by gender) makes it difficult to control for the wide variety individual specific personal characteristics that influence self-esteem. This may cause biased estimators.

- Unobserved heterogeneity

- Data selection (treatment of labor force drop outs). Most of the studies eliminate from the sample individuals who are out of the labor force. However, this group has to be also taken into account since they suffer a different effect on their self-esteem than unemployed.

The authors suggest that their methodology overcome these methodological problems and yield unbiased estimates of joblessness on self-esteem.

They used data from the National Longitudinal Survey of Youth to control for the employment history of the individuals between the years 1978-1980. And the self-esteem data is from 1980.

To solve the problem of unobserved heterogeneity, factors that alter the likelihood of becoming jobless and which are also expected to contribute to self-esteem were included in the regression.

In order to analyse the relationship between self-esteem and the explanatory variables the authors use an Ordered Probit. The main conclusion is that individuals exposed to a completed spell of joblessness in the most recent subperiod have significantly lower level of self-esteem than comparable individuals who are employed throughout the total sample period.

Another interesting conclusion is that there are not significant differences between the effects of being unemployed and the effects of being out of the labor force.

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[66] Goldsmith A.H., Veum J.R. & Darity W. (1996) The impact of labor force history on self-esteem and its component parts, anxiety, alienation and depression. *Journal of Economic Psychology* 17, 183-220.

Goldsmith et al. finally discompose the impact of joblessness on self-esteem in anxiety, alienation and depression. They conclude that joblessness damages self-esteem by generating feelings of depression.

Winefield A.H. et al.[67] use cross-sectional and longitudinal comparisons in order to test the psychological impact of unemployment and unsatisfactory employment.

They compare four groups of young individuals who were surveyed annually during seven years and who initially did not differ on any of the psychological measures of well-being. These four groups are: satisfied employed, dissatisfied employed, unemployed and full-time tertiary students.

The main finding of this study is that dissatisfied employed were generally as badly off as the unemployed (and worse off in the case of the females).

Beale & Nethercott[68,69] use general practice records of patients and their relatives who suffered a factory closure and the general practice records of a control group to analyse the relationship between unemployment and health.

To test for significant differences between the time periods in the numbers of acute and chronic episodes of illness the chi-square test and, where there were sufficient individual data, both the Wilcoxon signed rank test and the Mann-Whitney U test were used. Fisher's exact test was used to test for significant differences in the incidence of chronic diseases.

The main conclusion is that men who suffered the factory closure saw their general practitioners more often for episodes of illness requiring four or more consultations than when they were in secure employment.

One important conclusion of this study is that the increase in morbidity began two years before the factory closure, at the time when it became clear that the factory was going to close. This reflects a certain anticipatory effect.

Kessler et al.[70] combine cross-sectional and longitudinal analyses to obtain conclusions about the effects of employment and reemployment on distress.

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[67] Winefield A.H., Tiggemann M, & Winefield H.R. (1991) The psychological impact of unemployment and unsatisfactory employment in young men and women. *British Journal of Psychology* 82, 473-486.

[68] Beale N. & Nethercott S. (1985) Job-loss and family morbidity: a study of a factory closure. *Journal of the Royal College of General Practitioners* 35, 510-514.

[69] Beale N. & Nethercott S. (1988) The nature of unemployment morbidity. *Journal of the Royal College of General Practitioners* 38, 200-202.

[70] Kessler R.C., Turner J.B. & House J.S. (1989) Unemployment, reemployment, and emotional functioning in a community sample. *American Sociological Review* vol.54, 648-657.

They first carry out a cross-sectional analysis (using logistic regression equations) and the coefficients show that all distress measures were significantly elevated among the currently unemployed compared to the stably employed.

Following, they estimate (using OLS regression equations) the effects of distress in time 1 on the probability of reemployment.

The results show that distress is not negatively associated with reemployment as expected. One possible explication for this result is that people who are highly distressed by job loss are willing to accept whatever job. Another explanation could be that extreme distress is associated with more intense job search.

Kessler et al. also estimate the effect of reemployment on subsequent change in emotional functioning. They suggest that reemployment reduces the average symptom level, and also the risk of experiencing symptoms potentially severe enough to warrant professional intervention[71].

The authors also suggest that the reemployed may not have returned completely to their emotional state prior to job loss, the complete recovery comes after a year of being reemployed. They also analyse whether the recovery is different depending on the kind of job that the individual gets. The results suggest that reemployed are, in the short term, happy to have *any* job.

Gerlach & Stephan[72] use German data (GSOEP data for the waves 1984 until 1993) in order to analyse the effect of unemployment on unhappiness. They use a fixed effects model with individual and time effects for men and women of three age classes. They conclude that from the groups analysed, men 30 to 49 years old suffer most from unemployment, and women of the age group 50 years and older suffer least from unemployment.

Thiede & Traub[73] test the relationship between poverty and health using also German data, taking into account the double direction of causality between these variables.

The authors use a structural equation model and they conclude that a causal relationship between income and health exists in both directions.

Bardasi & Francesconi[74] analyse the effect of non-standard employment on mental health using UK data. The authors argue that many of the endogeneity problems arise from the

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[71] Kessler R.C., Turner J.B. & House J.S. (1989) Unemployment, reemployment, and emotional functioning in a community sample. *American Sociological Review* vol.54, 648-657.
[72] Gerlach K. & Stephan G. (1996) A paper on unhappiness and unemployment in Germany. *Economic Letters* 52, 325-330.
[73] Thiede M. & Traub S. Mutual influences of health and poverty. Evidence from German panel data. *Institut für Finanzwissenschaft und Sozialpolitik der Christian-Albrechts-Universität zu Kiel.* DP 54.

presence of individual-specific fixed endowments which are correlated with each other and with unobserved endogenous inputs. With a change model this problem is only partially solved.

They carry out three kinds of estimations: an OLS model (level analysis), a first-differenced fixed-effects model and a two-period lagged first-difference model (since the authors argue that a first-differenced model doesn't solve satisfactorily the endogeneity problem).

Bardasi & Francesconi conclude that two-period lagged first-differences yield consistent estimates under some orthogonality conditions. The results show that there is evidence of only a limited effect of all types of flexible employment on the mental health scores.

Graetz[75] uses Australian data to analyse the health consequences of employment and unemployment. He first conduces a cross-sectional analysis, using one-way analysis of variance (ANOVA) to test for statistically significant group differences.

The conclusion is that employment status has an important effect on psychological health. And for those who are employed quality of employment has also an important impact.

In the longitudinal analysis, pairwise comparisons are used to assess changes of the variables over time, while between group comparisons are used to test for predisposing differences.

From this analysis Graetz concludes that the health consequences of employment depend mainly on the quality of work, and not on prior health differences that may predispose some people to find their jobs satisfying or dissatisfying. The general conclusion from this study is that unemployment is not always worse that employment, it depends on the quality of work.

Wadsworth, Montgomery & Bartley[76] in their study test the relationship between unemployment and socio-economic and health capital acquired by age 33 years, and the association of pre-labour market factors with health and socio-economic capital at 33 years.

Logistic regressions were used for the analysis, and it was controlled for the effect of the childhood and adolescent factors known to influence acquisition of capital. The authors conclude that even six years after their last experience of unemployment, the individuals

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[74] Bardasi E. & Francesconi M. (2000) The effect of non-standard employment on mental health in Britain. *ISER Working Papers*. Paper 2000-37. Colchester: University of Essex.
[75] Graetz B. (1993) Health consequences of employment and unemployment: longitudinal evidence for young men and women. *Soc. Sci.Med.* vol.36 (6), 715-724.
[76] Wadsworth M.E.J., Montgomery S.M. & Bartley M.J. (1999) The persisting effect of unemployment on health and social well-being in men early in working life. *Soc. Sci. Med.* vol.48, 1491-1499.

were more likely than others to be found in socially and materially less favourable conditions than others of the same background and educational attainment. In addition, men who had previous long periods of unemployment had adopted less favourable health behaviour.

Gallo et al.[77] use data from the first two waves of the American Health and Retirement Survey (HRS) to investigate the health effects of involuntary job loss among older workers.

The dependent variables used in the model are physical functioning and mental health. And the independent variables are a dummy variable for involuntary job loss, measures of baseline health and several socio-economic variables[78]. In order to estimate this model they used OLS.

The authors suggest that endogeneity can derive from two sources: bad health may lead to involuntary job loss, and unobserved factors may be associated with both the likelihood of involuntary job loss and with follow-up health status. In order to test for the presence of endogeneity they use a Hausman specification test[79].

This implies a two-steps process:

1. They first regress the dummy variable for involuntary job loss on baseline health, all exogenous variables, and an instrumental variable (average weekly unemployment insurance). This instrumental variable was associated with involuntary job loss but not with the health indicators. They calculated the residuals from this regression.

2. These residuals were included as an additional regressor on the right-hand side of the follow-up health regressions and considered the statistical significance of the estimated coefficients on the residuals.

This test shows that involuntary job loss is not endogenously determined.

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[77] Gallo W. T., Bradley E..H.., Siegel M. & Kasl S.V. (2000) Health effects of involuntary job loss among older workers: findings from the health and retirement survey. *Journal of Gerontology: SOCIAL SCIENCES* vol.55B(3), 131-140.

[78] $H_{i,t+k} = \alpha + \beta_0 H_{i,t} + \beta_1 Z_{i,t} + \gamma d_i + \varepsilon_{i,t+k}$

Where:
H is an index of either physical or mental health,
Z is a vector of personal attributes measured at the date of the survey,
d is a dichotomus dummy variable defined to take the value 1 if $t<s<t+k$ and 0 otherwise (job loss occurs between the two points in time at which we observe health),
ε ia a stochastic error term.
γ captures the average effect of job lossfor workers in the sample who experience involuntary job loss relative to those who remain continuosly employed.

[79] Hausman J. (1978) Specification tests in econometrics. *Econometrica* 46, 1251-1271.

The results of the estimations indicate that longer unemployment spells are suggestive of poorer physical functioning and mental health at follow-up. Furthermore, reemployment was positively associated with physical functioning and mental health.

Gallo et al.[80] use data from the GSOEP in order to analyse the relationship between job displacement and self-assessed health. The study compares displaced workers and continuously employed.

They use a residualized change model, in which they control for the baseline self-assessed health and for standard demographic characteristics[81].

The authors first estimate the model using OLS, and following they use GEE (Generalized Estimating Equations). After testing for endogeneity using the method suggested by Hausman, they conclude that there is not significant simultaneity.

The estimation results suggest that the association between displacement and follow-up self-assessed health is not significant.

Clark et al.[82] use the first eleven waves of the GSOEP in order to analyse the psychological impact of past unemployment.

They first use an ordered probit model in order to test the following hypothesis:

- The currently unemployed report lower life satisfaction scores than those in full-time salaried work.

- Past unemployment reduces the current wellbeing of those who are currently in employment.

- The effect of current unemployment on wellbeing is smaller for those who have been already unemployed in the past (habituation effect).

The main conclusions of this analysis are:

- Current unemployment is associated with lower levels of subjective wellbeing.

- Past unemployment reduces the wellbeing of those who are currently employed.

- Wellbeing effect of current unemployment is attenuated for those who have experienced more unemployment in the past.

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[80] Gallo W.T., Bradley E..H. & Kasl S.V. (2000) The effect of job displacement on subsequent health. Paper presented in the GSOEP' Users Conference 2000. Berlin.

[81] $H_{it} = \beta_0 + \sum^J \beta_{1j} X_{ijt-1} + \beta_2 H_{it-1} + \beta_3 D_{is} + \beta_4 p + \varepsilon_{it}$

where,

D_{is} is a dummy variable indicating displacement, where t-1<s<t; and,

p is a control for the panel contributing the observation.

[82] Clark A.E., Georgellis Y. & Sanfey P. (2001) Scarring: the psychological impact of past unemployment. *Economica* 68, 221-241.

To address the problem of simultaneity, the authors use a fixed-effects model (concretely a fixed-effect logit).

Another interesting conclusion of their study is that the larger the drop in life satisfaction from employment to unemployment, the smaller is the probability that the individual remains unemployed one year later. The authors come to this conclusion after an analysis of changes in life satisfaction.

3.4. Multilevel analysis

When the data fall naturally into hierarchical structures, it has to be analyzed using multilevel models. These hierarchical structures consist of multiple macro units, and multiple micro units within each macro unit. The goal is to analyse variations at each level of the hierarchy.

Bartley[83] in her study argues that by analysing the relation between unemployment and health, it has to be taken into account that usually the same groups of people experience low income, job insecurity and poor housing, and that these aspects are difficult to differentiate since the effects of each separate issue are dependent upon and reinforced by the others.

She argues that only the whole pattern can satisfactorily explain the relationship between unemployment and health[84].

4. Adaptation to unemployment

In the previous sections we have reviewed what the literature tell us about the effect of loosing a job. However, whether or not the individual adapts himself to his new role has been also an important topic in the literature.

Some authors argue that unemployed get used to their situation, and after few months their health and well-being is stabilised at a low level and does not suffer significant variations. This view is explained by the stages model (reviewed in the section 1.4). This model tell us that the individual after suffering a shock, is still optimistic and look actively for a job. Then, when all the efforts fail he becomes pessimistic and suffers distress. Finally, the individual becomes fatalistic and adapts to his new role, but with lower well-being.

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[83] Bartley M. (1988) Unemployment and health: selection or causation- a false antithesis? *Sociology of Health and Illness*, vol.10(1), 41-63.
[84] Jones A. (2000) Health Econometrics, in *Handbook of Health Economics*. Culyer A.J. & Newhouse J.P. eds. Elsevier.

However, other studies conclude that unemployed do not adapt themselves to their situation and that the drop in health and wellbeing increases as the length of the unemployment spell increases.

Next, we review briefly some studies that defend one and the other position.

4.1. Adaptation Evidence

Warr And Jackson[85] examine changes in mental health associated with continuing unemployment[86]. They analyse also which factors may influence this process of adaptation.

In order to measure adaptation they used changes in reported health. And the factors that were introduced in the analyses in order to test whether they were affecting adaptation or not were commitment to having a job, availability of money, age, social relationships and continuing health condition. The results show that there is a certain adaptation process. The authors classify the situation of long-term unemployed in the following categories:

- Constructive adaptation: a number of individuals develop interests and activities outside the labour market.

- Resigned adaptation: the individuals make also improvements. However, these small improvements are accompanied by negative changes in other aspects (reduced aspiration, autonomy and competence).

- Despair: some individuals suffer from low levels in all the aspects: reduced well-being and also low levels of aspiration, autonomy and competence.

In the analysis of which are the factors affecting the process of adaptation, the results show that stronger commitment to having a job and membership of the medium age group are associated with less adaptation.

In another study[87] the authors conclude that a part from these two factors also the length of unemployment affects changes in health.

Clark and Oswald[88] in their analysis of the relationship between unemployment and happiness conclude that long time unemployed show less distress than those who recently lost their jobs. Therefore they conclude that there is a certain adaptation process.

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[85] Warr P. & Jackson P. (1987) Adapting to the unemployed role: a longitudinal investigation. *Soc. Sci. Med.* vol. 25(11), 1219-1224.
[86] Concretelly, they chose a sample of men who were continuosly unemployed for an average of more than two years.
[87] Warr P. & Jackson P. (1985) Factors influencing the psychological impact of prolonged unemployment and re-employment. *Psychological Medicine* 15, 795-807.
[88] Clark A.E. & Oswald A.J. (1994) Unhappiness and unemployment. *The Economic Journal* 104, 648-659.

Eales[89] analyses the relationship between unemployment and depression and anxiety. The author concludes that most of the disorders arising after job loss are developed within three months after job loss. This result like the previous ones supports the step theory.

Clark et al.[90] in their analysis of the psychological impact of past unemployment, conclude that there is a certain habituation of the individual to the unemployment experience. The authors conclude that the effect of current unemployment on wellbeing is attenuated for those who had unemployment experiences in the past.

4.2. Non-Adaptation Evidence

Frese and Mohr[91] in their study of the effect of prolonged unemployment on depression argue that financial problems and depression increase and hope decreases with prolonged or repeated unemployment.

The authors use analyses of covariances to show that the long-term exposure to the daily hassles of unemployment (financial problems and disappointments) is what increases depression.

Summarising, unemployed don't feel better when the period of unemployment increases. On the contrary, the problems are accentuated.

Wikelmann and Winkelmann[92] in their descriptive analysis of the relationship between unemployment and happiness conclude that unemployed don't get used to their situation. However, the argument that they use is that there is little variation for the individual during the unemployment spell. And precisely this argument has been used before to argue that there is adaptation.

Wadsworth et al.[93] in his study do not answer directly the question whether or not unemployed get used to their situation. In stead of that they measure the irreversible effects of persisting unemployment on the individual.

They conclude that there is a depreciation of socio-economic capital for the individuals who have been unemployed early in their careers. Furthermore, they are more likely to adopt less favorable health behavior.

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[89] Eales M.J. (1988) Depression and anxiety in unemployed men. *Psychological medicine* 18, 933-945.
[90] Clark A.E., Georgellis Y. & Sanfey P. (2001) Scarring: the psychological impact of past unemployment. *Economica* 68, 221-241.
[91] Frese M. & Mohr G (1987) Prolonged unemployment and depression in older workers: a longitudinal study of intervining variables. *Soc. Sci. Med.* 25(2), 173-178.
[92] Winkelmann L. & Winkelmann R. (1998) Why are unemployed so unhappy? Evidence from Panel Data. *Economica* 65, 1-15.
[93] Wadsworth M.E.J., Montgomery S.M. & Bartley M.J. (1999) The persisting effect of unemployment on health and social well-being in men early in working life. *Soc. Sci. Med.* vol. 48, 1491-1499.

Some studies also analyse how the probability of reemployment is affected by distress suffered by unemployed.

Kessler et al.[94] use panel data in order to estimate the effects of time 1 distress on the probability of reemployment. The results show that distress is not negatively associated with reemployment.

The authors argue that this may be due to the fact that individuals who are highly distressed by job loss are willing to accept the next job that come along. Another possible explanation for this result is that extreme distress is associated with more intense job search.

They also analyse the impact of reemployment on subsequent change in emotional functioning. The evidence showed that reemployment reduced the average symptom level. Furthermore, the authors also concluded that the recovery was not significantly different depending on the quality of the job.

Warr and Jackson[95] in their analysis of changes in mental health in prolonged unemployment spells, investigate which are the factors affecting the probability of re-employment.

The multiple regression analysis shows that age (being between 29-59 years) and time in unemployment (had been unemployed for shorter time) are the factors which have an effect on the probability of remaining out of work.

4.3. Anticipation evidence

In some plant closure studies has been also analyzed which is the anticipation effect on health of announcing the closure.

In Beale & Nethercott[96] the consequences of unemployment and health after a plant closure are investigated. They conclude that there is a significant increase in the number of times that the employees and their spouses consult their doctors.

They also conclude that this increase in morbidity began two years before the plant closure, when it was clear for the families that the plant was going to be closed.

[94] Kessler R.C., Turner J.B. & House J.S. (1989) Unemployment, reemployment and emotional functioning in a community sample. *American Sociological Review* vol.54, 648-657.
[95] Warr P. & Jackson P. (1985) Factors influencing the psychological impact of prolonged unemployment and re-employment. *Psychological Medicine* 15, 795-807.
[96] Beale N. & Nethercott S. (1985) Job-loss and family morbidity: a study of a factory closure. *Journal of the Royal College of General Practitioners* 35, 510-514.

5. Explanatory Variables

The objective of this section is to review the main covariates used in the models which analyse the effects of unemployment on health and wellbeing.

The reviewed studies include not only employment status variables but also other kind of control variables which we review and classify in this section and which are presented in table 2.

The dependent variables can be classified in mental health indicators, physical health indicators, and life satisfaction.

There are some control variables which are included almost in every model. These control variables are mainly: age (and age squared), sex, race, marital status, education and number of children (or members) in the household.

There are some studies (Theodossoiou[97], Rodríguez[98] and Graetz[99]) which include also housing conditions. In the analysis of Graetz also the birthplace is included in the analysis. And in the one of Clark and Oswald[100]) a variable is included which indicates whether or not the region where the individual lives is a region of high unemployment. Gallo et al.[101] introduce in their analysis for the German population a dummy variable indicating whether the individual is from east or from west Germany.

These control variables are assumed to be important determinants of mental and physical health and of life satisfaction, and therefore they are included in almost every model.

Other important group of explanatory variables are that ones that control for the financial situation and for the socio-economic status of the individual. The main variables included are: individual income, household income, financial strain, wage on most recent job, and income change (after a change in the labour status).

[97] Theodossiou I. (1998) The effects of low-pay and unemployment on psychological well-being: a logistic regression approach. *Journal of Health Economics* 17, 85-104.

[98] Rodriguez E. (1999) Marginal employment and health in Germany and the United Kingdom. Does unstable employment predict health? Wissenschaftszentrum Berlin für Sozialforschung. Discussion Paper FS I 99-203. Berlin.

[99] Graetz B. (1993) Health consequences of employment and unemployment: longitudinal evidence for young men and women. *Soc. Sci. Med.* 36(6), 715-724.

[100] Clark A.E. & Oswald A.J. (1994) Unhappiness and unemployment. *The Economic Journal* 104 (May),648-659.

[101] Gallo W.T., Bradley E.H. & Kasl S.V. (2000) The effect of job displacement on subsequent health. GSOEP Users Conferece 2000. Berlin.

An interesting variable included in the study of Gallo et al.[102] is the non-housing net worth, since the financial strain for individuals who have lost their jobs may be very different depending on their net worth.

Gore introduces the perceived economic deprivation. The variables that he uses are income comparisons with friends and neighbours and difficulty in 'getting by' financially. These control variables are interesting since they indicate how the individual perceives his own financial situation in comparison to his relevant ones. These indicators of the relative financial situation of the individual, when available, may be more significant that absolute financial indicators when explaining mental health.

Health indicators are also included in the models which analyse follow-up health. In these models, the baseline health indicators are introduced in order to control for the previous health condition of the individual. For example Kessler et al.[103] use as a control variable distress at time 1 in order to explain distress at time 2. Gallo et al.[104] to explain the follow-up self-assessed health use as a explanatory variable the baseline self-assessed health.

Some studies include also some variables that indicate social support. Gore in his analysis introduces the individual perception of wife, friends and relatives as supportive and unsupportive, frequency of activity outside the home and respondent's perceived opportunity for engaging in social activities which are satisfying and which allow him to talk about his problems. Warr and Jackson[105] introduce as control variables emotional support, social contact and institution membership.

For the employment related information the authors use different indicators. These variables can be classified in the following categories: being unemployed or not, characteristics of the job (if the individual is employed), past spells of unemployment and duration of the unemployment spells. Graetz[106] introduces also job satisfaction as a explanatory variable. Dooley et al.[107] introduce perceived and objective job security as

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[102] Gallo W.T., Bradley E.H., Siegel M. & Kasl S.V. (2000) Health effects of involuntary job loss among older workers: findings from the health and retirement survey. *Journal of Gerontology: SOCIAL SCIENCES* 55B(3), S131-S140.

[103] Kessler R.C., Blake Turner J. & House J.S. (1989) Unemployment, reemployment, and emotional functioning in a community sample. *American Sociological Review* 54, 648-657.

[104] Gallo W.T., Bradley E.H. & Kasl S.V. (2000) The effect of job displacement on subsequent health. GSOEP Users Conferece 2000. Berlin.

[105] Warr P. & Jackson P (1985) Factors influencing the psychological impact of prolonged unemployment and re-employment. *Psychological Medicine* 15, 795-807.

[106] Graetz B. (1993) Health consequences of employment and unemployment: longitudinal evidence for young men and women. *Soc. Sci. Med.* 36(6), 715-724.

[107] Dooley D., Rook K. & Catalano R. (1987) Job and non-job stressors and their moderators. *Journal of Occupational Psychology* 60, 115-132.

explanatory variable. Winkelmann and Winkelmann[108] also introduce the employment status of the partner as explanatory variable. Another interesting variable is employment commitment which was introduced by Warr and Jackson[109] in their analysis.

Only few studies introduce interaction effects between market labour transitions or status and other variables. Winkelmann and Winkelmann[110] (1998) introduce in their analysis interaction effects between employment status and age groups. Dooley et al. (1987) introduce in their model interaction effects between undesirable job and non-job events and other variables.

By introducing interaction effects it can be tested which are the factors which moderate or stress the effect of unemployment. In the typical case of the interaction effect between unemployment and age, we can test which age groups are more affected by unemployment.

It is also very interesting to interact unemployment with the variables which indicate social support. In this way it can be tested whether or not social support plays an important role in moderating the effect of unemployment. Another interesting interaction is the one between unemployment and satisfaction with the last job. The idea is that if the dissatisfaction of the individual with his last job can be a moderator for the effect of unemployment. The unsatisfied individuals may be less affected by unemployment.

[108] Winkelmann l & Winkelmann R. (1995) Unemployment: where does it hurt? Centre for Economic Policy Research. Discussion Paper n.1093. London.
[109] Warr P. & Jackson P (1985) Factors influencing the psychological impact of prolonged unemployment and re-employment. *Psychological Medicine* 15, 795-807.
[110] Winkelmann L. & Winkelmann R. (1998) Why are the unemployed so unhappy? Evidence from panel data. *Economica* 65, 1-15.

TABLES

TABLE 1. LONGITUDIANAL MODELS PROPOSED BY TWISK.

Model 1: Actual Values	Model 2: Time-lag	Model 3: Changes	Model 4: Auto-regression
$Y_{it}=\beta_0+\Sigma^J\beta_{1j}X_{ijt}+\Sigma^K\beta_{2k}Z_{ikt}+\beta_3 t+\Sigma^M\beta_{4m}G_{im}+\varepsilon_{it}$	$Y_{it}=\beta_0+\Sigma^J\beta_{1j}X_{ijt-1}+...$	$(Y_{it}-Y_{it-1})=\beta_0+\Sigma^J\beta_{1j}(X_{ijt}-X_{ijt-1})+...$	$Y_{it}=\beta_0+\Sigma^J\beta_{1j}X_{ijt}+\beta_2 Y_{it-1}+...$
X_{ijt} = independent variable j of subject i at time t. Z_{ikt} = time-dependent covariate k of subject i at time t. β_3 = regression coefficient of time. G_{im} = time-independent covariate m of subject i.	X_{ijt-1} = independent variable j of subject i at time t-1.	Y_{it-1} = observation of subject i at time t-1.	Y_{it-1} = observation of subject i at time t-1. β_2 = autoregression coefficient.
The coefficients β_{1j} show the magnitude of the relation between the longitudinal development of Y_{it} and the development of different predictor variables.	In some situations, it can be difficult to distinguish between cause and effect. To tackle part of this problem a model can be used in which the <u>temporal sequence of cause and effect</u> is built in.	In the combined analysis the longitudinal within-subjects relationships will be more or less overruled by the cross-sectional between-subjects relations when the variation in actual values between-subjects exceeds the changes over time within-subjects. Because of this limitation, a model can be used in which <u>the cross-sectional part is removed from the analysis</u>.	Some times in longitudinal analysis, the results can be influenced by the relative stability of the related variables. <u>To correct for the relative stability of the related variables an autoregressive model can be used.</u>
Pool together longitudinal and cross-sectional relationships into one regression coefficient.	Pool together longitudinal and cross-sectional relationships into one regression coefficient.	The cross-sectional part is removed from the analysis. Not for modelling changes dichotomous outcomes.	
Also for dichotomous outcome variables.	Also for dichotomous outcome variables.	Not for modelling changes dichotomous outcomes.	Also for dichotomous outcome variables.

TABLE 2. EXPLANATORY VARIABLES OF THE REVIEWED STUDIES.

Study	Dependent Variables	Explanatory Variables
• Gore [111] (1978)	• Depression • Illness symptoms • Cholesterol	**(Social support)** • Individual perception of wife, friends and relatives as supportive or unsupportive. • Frequency of activity outside the home. • Respondent's perceived opportunity for engaging in social activities which are satisfying and which allow him to talk about his problems. **(Perceived economic deprivation)** • Income comparisons with friends and neighbours. • Difficulty in 'getting by' financially.
• Warr and Jackson[112] (1985)	• Psychological ill-health. • Reported health. • Reported health change.	**(Employment situation)** • Employment commitment. • Job seeking. **(Financial situation)** • Income change. • Financial strain. • Number of dependants. • Money problems. • Financial support. **(Personal situation)** • Non-money problems. • Emotional support. • Social contact. • Institution membership.
• Dooley et al.[113] (1987)	• PERI symptoms (a 25-item psychological symptom checklist from the Psychiatric Epidemiology Research Instrument). • CESD (20-items on the Centre for Epidemiological Studies Depression Scale)	**(Control variables)** • Age. • Sex. • Ethnicity. • Socio-economic status. **(Life event variables)** • Desirable and undesirable job events. • Desirable and undesirable other (non-job events). **(Social support and help utilisation)** • Variable for the job sphere. • Variable for the non-job sphere. **(Job security)** • Perceived job security. • Objective job security. **(Interaction effects of the undesirable job and non-job events with the other variables)** **(Triple interaction effects)**
• Frese and Mohr[114] (1987)	• Depression (German translation of Zung's scale)	• Financial difficulties. • Hope for control. • Internal/External control. • General activity level.

[111] Gore S. (1978) The effect of social support in moderating the health consequences of unemployment. *Journal of Health and Social Behaviour* 19, 157-165.

[112] Warr P. & Jackson P (1985) Factors influencing the psychological impact of prolonged unemployment and re-employment. *Psychological Medicine* 15, 795-807.

[113] Dooley D., Rook K. & Catalano R. (1987) Job and non-job stressors and their moderators. *Journal of Occupational Psychology* 60, 115-132.

[114] Frese M. & Mohr G. (1987) Prolonged unemployment and depression in older workers: a longitudinal study of intervening variables. *Soc. Sci. Med*. 25(2), 173-178.

• Eales[115] (1988)	• Psychiatric disorder (present state examination)	**(Personal characteristics)** • Age. • Marital status. • Life events and difficulties schedule. **(Employment situation)** • Length of unemployment. • Occupational status.
• Kessler et al.[116] (1989)	• Distress at time 2.	**(Controls)** • Age. • Sex. • Education. • Race. • Marital Status. **(others)** • Distress at time 1. • Reemployment.
• Kessler et al.[117] (1989)	• Probability of becoming reemployed.	**(Controls)** • Age. • Sex. • Education. • Race. • Marital Status. **(others)** Distress at time 1.
• Graetz[118] (1993)	• Psychiatric disorder (GHQ). (for employed, studying and unemployed respondents)	**(Demographic attributes)** • Sex. • Age. • Birthplace. • Marital status. **(Living arrangements)** • Lives with parents. • Nature of occupancy. **(Socio-economic status)** • Income. **(Labour force experiences)** • Job spells. • Looking for work spells. • Job satisfaction. • Duration of unemployment.
• Arrow[119] (1994)	• Employment duration	**(Personal characteristics)** • Age. • Gender. • Nationality. • Chronic illness. • Sick-leave > 42 days. **(Employment situation)** • Past unemployment. • Employment sector. • Firm size.

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[115] Eales M.J. (1988) Depression and anxiety in unemployed men. *Psychological Medicine* 18, 935-943.

[116] Kessler R.C., Blake Turner J. & House J.S. (1989) Unemployment, reemployment, and emotional functioning in a community sample. *American Sociological Review* 54, 648-657.

[117] Kessler R.C., Blake Turner J. & House J.S. (1989) Unemployment, reemployment, and emotional functioning in a community sample. *American Sociological Review* 54, 648-657.

[118] Graetz B. (1993) Health consequences of employment and unemployment: longitudinal evidence for young men and women. *Soc. Sci. Med.* 36(6), 715-724.

• Clark and Oswald[120] (1994)	• Mental well-being	**(Personal characteristics)** • Sex. • Age. • Age*Age. • Education. • Race. • Marital status. • Number of children. • Health. • Region (region with high unemployment). **(Employment status)** • Dummy variables indicating the employment status of the individual.
• Winkelmann and Winkelmann[121] (1995)	• Life satisfaction	**(Personal characteristics)** • Age. • Age*Age. • Marital status. • Good health. **(Income)** • Log of the family income. **(Employment status)** • Variables indicating whether the individual is unemployed, out of the labour force, self-employed, part-time employed). **(Employment status of the partner)** • Variables indicating whether the partner is unemployed, out of the labour force, self-employed, part-time employed).
• Gerlach and Stephan[122] (1996)	• Life satisfaction (per sex and age groups)	**(Personal characteristics)** • Marital status. • Degree of disability. • Satisfaction with health. **(Income)** • Household income per capita. **(Employment status)** • Variables indicating whether the individual is full-time, part-time employed or unemployed).
• Goldsmith et al.[123] (1996)	• Level of self-esteem.	**(Personal characteristics)** • Perceived personal locus of control. • Position in the life cycle. • Marital status. • Sex. • Race. • Presence of young dependants. **(Income)** • Wage on most recent job. • Accumulated financial assets.

[119] Arrow J.O. (1994) The influence of health on unemployment in Germany: a duration model. DIW-Vierteljahresbericht, 1333-138. Berlin.

[120] Clark A.E. & Oswald A.J. (1994) Unhappiness and unemployment. *The Economic Journal* 104 (May),648-659.

[121] Winkelmann 1 & Winkelmann R. (1995) Unemployment: where does it hurt? Centre for Economic Policy Research. Discussion Paper n.1093. London.

[122] Gerlach K. & Stephan G. (1996) A paper on unhappiness and unemployment in Germany. Economics Letters 52, 325-330.

[123] Goldsmith A.H., Veum J.R. & Darity W. Jr. (1996) The impact of labor force history on self-esteem and ist component parts, anxiety, alienation and depression. *Journal of Economic Psychology* 17, 183-220.

		(Employment spell) • Being currently unemployed or out of the labour force. • Duration of current unemployment or time spent out of the labour force. • Past time spent in spells of unemployment, out of the labour force, or time in both states of joblessness. • Skills acquired.
• Winkelmann and Winkelmann[124] (1997)	• Life satisfaction	**(Personal characteristics)** • Age. • Age*Age. • Marital status. • Good health condition. **(Employment situation)** • Current labour market status (unemployed / out of the labour force). • Duration of the unemployment spell. • Duration*Duration. **(Interaction effects between employment status and age groups)**
• Theodossiou[125] (1998)	• Psychological well-being	**(Control variables)** • Age. • Sex. • Ethnicity. • Marital status. • Number of children. **(Personal characteristics)** • Education. • Housing characteristics. **(Employment status)** • Dummy variables indicating whether the individual is unemployed, low paid, high paid, not in the labour force.
• Rodriguez[126] (1999)	• Perceived health status 1993.	**(Fixed personal characteristics)** • Age. • Sex. **(Other individual and household characteristics)** • Education. • Marital status. • Household income. • Home ownership. • Number of family members. **(Background risk factors)** • Previous health status. • Previous unemployment. • Time spent on unpaid housekeeping work. **(Employment status 1992)** • Full-time employed (with permanent, with fix-term or without contract).

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[124] Winkelmann L. & Winkelmann R. (1998) Why are the unemployed so unhappy? Evidence from panel data. *Economica* 65, 1-15.

[125] Theodossiou I. (1998) The effects of low-pay and unemployment on psychological well-being: a logistic regression approach. *Journal of Health Economics* 17, 85-104.

[126] Rodriguez E. (1999) Marginal employment and health in Germany and the United Kingdom. Does unstable employment predict health? Wissenschaftszentrum Berlin für Sozialforschung. Discussion Paper FS I 99-203. Berlin.

		• Working 20 to 30 hours per week (with permanent, with fix-term or without contract). • Working less than 20 hours per week (with permanent, with fix-term or without contract). • Unemployed. • Housewives/husbands. • Students. • Retired. • Other.
• Bardasi and Francesconi[127] (2000)	• Mental health (GHQ)	• Number of cigarettes smocked. • Education. • Work experience. • Types of non-standard employment (e.g. being on a fixed term contract working long hours, being on rotating shifts).
• Gallo et al.[128] (2000)	• Follow-up self-assessed health (SAH)	**(Personal characteristics)** • Age. • Male gender. • Marital status. • Education. • East German. • Baseline SAH. **(Employment status)** • Job displacement. • Blue-collar occupation. • Hourly wage. • Services (if baseline employment in services industry).
• Gallo et al.[129] (2000)	• Physical functioning.	**(Personal characteristics)** • Age. • Education. • Male. • White. • Marital status. **(Income)** • Labour income. • Non-housing net worth. **(Health)** • Hypertension. • Cancer. • Heart disease. • Heavy smoker. • Heavy drinker. • Obese. • Baseline physical functioning. **(Employment status)** • 3 different regressions using for each one, one of the following explanatory variables: involuntary job loss, employment duration and reemployment.

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[127] Bardasi E. & Francesconi M. (2000) The effect of non-standard employment on mental health in Britain. ISER Working Papers. Paper 2000-37 Colchester:University of Essex.
[128] Gallo W.T., Bradley E.H. & Kasl S.V. (2000) The effect of job displacement on subsequent health. GSOEP Users Conferece 2000. Berlin.
[129] Gallo W.T., Bradley E.H., Siegel M. & Kasl S.V. (2000) Health effects of involuntary job loss among older workers: findings from the health and retirement survey. *Journal of Gerontology: SOCIAL SCIENCES* 55B(3), S131-S140.

• Gallo et al. [130] (2000)	• Mental health.	**(Personal characteristics)** • Age. • Education. • Male. • White. • Marital status. **(Income)** • Labour income. • Non-housing net worth. **(Employment status)** • 3 different regressions using for each one, one of the following explanatory variables: involuntary job loss, employment duration and reemployment.
• Clark et al.[131]	• Life satisfaction	**(Employment status)** • Unemployed at time t. • Past unemployment. **(Individual and other cahracteristics for males and females)** • Age. • Age Square. • Income. • Years of education. • Disability. • Out of labor force/ Par-time/ Self-employed. • Number of children. • Married/ Separated/ Divorced. • House owner. **(Interaction terms)** • Unemployment*Past unemployment. • Current and past unemployment with: age, education and children.

[130] Gallo W.T., Bradley E.H., Siegel M. & Kasl S.V. (2000) Health effects of involuntary job loss among older workers: findings from the health and retirement survey. *Journal of Gerontology: SOCIAL SCIENCES* 55B(3), S131-S140.

[131] Clark A.E., Georgellis Y. & Sanfey P. (2001) Scarring: the psychological impact of past unemployment. *Economica* 68, 221-241.

CHAPTER 2
HOW IS HEALTH MEASURED?

1. Introduction

The health indicator used in following chapters in order to analyse the relationship between unemployment and health is health satisfaction. This subjective indicator of health is a global indicator which includes physical, psychological and social aspects.

Subjective indicators are nearer to the WHO (World Health Organisation) definition of health ('complete state of physical, mental and social well-being') than objective indicators.

In the GSOEP questionnaires, individuals answer to the question How satisfied are you with your health?. The response must be rated in a scale from 0 (very dissatisfied) to 10 (very satisfied)[132].

In the present chapter we first review what the literature tell us about what do these subjective indicators really mean, and which are their advantages with respect to objective indicators of health (section 2).

In the third section, the validity of these indicators is analysed by reviewing different studies which analyse the relationship between objective and subjective health indicators.

In section 4, we review different interpretations of the relationship between subjective and objective health indicators.

Finally, in the fifth section we present the health response model developed by Kerkhofs and Lindeboom[133], and we apply this model using GSOEP data in order to analyse the response behaviour of unemployed individuals.

2. Subjective health indicators and their advantages

Subjective health indicators are usually the responses to the following questions:

- How satisfied are you with your health?,
- How would you rate your present health?.

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[132] In Table 1 we observe frequencies of this variable for several waves of the GSOEP. We observe that only the 15% of the reports are lower than 5. This means that there is a certain concentration of the answer in the higher values of the scale. In following chapters we present further descriptives of health satisfaction for the sample selected for the analysis of the relationship between unemployment and health.

[133] Kerkhofs M. and Lindeboom M. (1995) Subjective health measures and state dependent reporting errors. *Health Economics* vol 4: 221-235.
Kerkhofs M. and Lindeboom M. (2002) Health and work of the elderly: subjective health measures, reporting errors and the endogenous relationship between health and work. *IZA*. Discussion Paper n. 457.

There has been an important debate in the literature about what these indicators actually mean.

Miilunpalo et al.[134] argue that subjective health assessments reflect a person's integrated perception of health, including its biological, psychological and social dimensions. Aspects that are not accessible for external observers.

Manderbacka et al.[135] argue that self-ratings are the sum of a person's medical health status and its functional consequences. Self-ratings reflect serious chronic conditions but are not affected by transitory illnesses (even if they are acute).

Kaplan[136] argued that poor perceived health may be a *common feature* which links various adverse psychological states such as social isolation, negative life events, depression, and job stress.

Liang[137] defined subjective health as the individual's perception and evaluation of his her overall health.

Summarising, these authors consider that subjective health assessment are global indicators of a person's perception oh health, which includes not only physical aspects but also psychological and social aspects. This feature makes this indicator attractive.

Furthermore, subjective health indicators have other advantages which make them (for concrete studies) more desirable than objective health indicators. These advantages have been described in the literature.

Helmer et al.[138] point out the following advantages of a subjective health indicator.

- It is easy to collect.

- It is a positive indicator of health (unlike morbidity and morbidity), and furthermore, considers the subject's psychology, experience and well-being.

- It refers to self-appraisal of health by the subject and not to a judgement made by a health professional. This dimension is particularly interesting in elderly people, for whom quality of life is often more relevant than specific diagnosis.

[134] Miilumpalo S., Vuori I., Oja P., Pasanen & Urponen H. (1997) Self-rated health status as a health measure: The predictive value of self-reported health status on the use of physician services and on mortality in the working age population. *J Clin Epidemiol* vol. 50(5), pp.517-528.

[135] Manderbacka K, Lahelma E. & Martikainen P. (1998) Examining the continuity of self-rated health. *International Journal of Epidemiology* 27, 208-213.

[136] Kaplan G. in Idler E.L. & Benyamini (1997) Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behaviour*, vol.38(March):21-37.

[137] Liang in Helmer C., Barberger-Gateau P., Letenneur L. & Dartigues J-F. (1999) Subjective health and mortality in French elderly women and men. *Journal of Gerontology: SOCIAL SCIENCES* vol.54B(2), S84-S92.

[138] Helmer C., Barberger-Gateau P., Letenneur L. & Dartigues J-F. (1999) Subjective health and mortality in French elderly women and men. *Journal of Gerontology: SOCIAL SCIENCES* vol.54B(2), S84-S92.

Schwarze et al.[139] argue that subjective health indicators might be a simple instrument to help in allocating resources, to justify interventions by health policy, and to predict retirement or utilization of medical care.

Maddox & Douglass[140] point out that the subjective belief that one is healthy or ill may be more important that actual medical status in predicting an individual's general emotional state and behaviour.

However, the authors also review some critics to these indicators; like the one of Haberman who argued that respondents are demonstrably unreliable reporters of particular morbid conditions of interest in relation to epidemiologists trying to determine prevalence rates.

Sammartino[141] also reviewed the main critics to self-reported health status. Because of social pressures, people might have an incentive to misrepresent health status.

Jylhä et al.[142] argue that self-rated health is a useful health outcome in research because it is simple, short and global. However, because of the subjective nature of the indicator, it can not be standardised. It is also not possible to recognise which criteria uses the respondent to evaluate his health.

Ahn[143] remarks that self-assessed health indicators should not be used for cross-country comparisons due to the predominant effect in the report behavior of culture and social environment.

Sen[144] also remarks the limitations of self reported morbidity indicators when comparing areas which have diverse medical conditions, educational achievements and so on. Under Sen's point of view, individuals' internal assessment may be seriously influenced by his social experience.

Mossey and Shappiro[145] argue that self-rated health can provide a means to detect persons for whom the risk of dying appears higher than indicated by their objective health status. The 'health pessimists' have greater risk of dying than those who had objectively poor health but who rated optimistically their health.

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[139] Schwarze J., Andersen H.H. & Anger S. (2000) Self-rated health and changes in self-rated health as predictors of mortality. First evidence from German Panel data. *DIW DP 203*.

[140] Maddox G.L. & Douglass E.B. (1973) Self-assessment of health: a longitudinal study of elderly subjects. *Journal of Health and Social Behaviour* 14(1), 87-93.

[141] Sammartino F.J. (1987) The effect of health on retirement. *Social Security Bulletin*, vol.50(2), 31-47.

[142] Jylhä M., Guralnik J.M., Ferrucci L, Jokela J. & Heikkinen E. (1998) Is self-rated health comparable across cultures and genders? *Journal of Gerontology: SOCIAL SCIENCES*, vol.53B(3), S144-S152.

[143] Ahn N. (2002) Assessing self-assessed health data. FEDEA. Working Paper 2002-24.

[144] Sen A. (2002) Health: perception versus observation. British Medical Journal 324 (April):860-861.

[145] Mossey J.M. & Shapiro E. (1982) Self-rated health: a predictor of mortality among the elderly. American Journal of Public Health, vol.72(8), 800-807.

Summarising, although most authors remark the advantages of subjective indicators like their simplicity or the simplicity of collecting them, some authors also point out some drawbacks in the use of these indicators.

These critics like the risk of having unreliable responses of the individuals could be arguments against the validity of these indicators. Therefore, in the next section, we review some studies which analyse the validity of subjective indicators of health.

3. Validity of the Subjective Health Indicators

In this section we review the main conclusions of the literature about the validity of the subjective health indicators.

Within the subjective health indicators, we can distinguish between health satisfaction and self-rated health status. In this section we review validity analysis independently of the type of subjective indicator used by the author.

Most of the validity studies reviewed, analyse the association between subjective indicators and objective indicators like doctor visits, or the association between subjective indicators and mortality.

Miilunpalo et al.[146] evaluate self-rated health status as a health measure. They use a sample of working-age population and analyse the following aspects:

- Analysis of the associations between self-assessments of health and:
    - The number of annual outpatient physician visits and,
    - The age specific mortality in a prospective study.
- Evaluation of the stability of a perceived global health status in two repeated surveys one year apart.

With their analysis they confirm that there is a predictive association between perceived health and future mortality, not only in the elderly but also in the middle-aged. There is also a strong and nearly linear relationship between self-rated health and the use of the physician services during the next year following the survey. There was in the sample also an inverse association (in both sexes) between perceived fitness and age-adjusted risk of mortality. And finally, the stability of the self-reported health status was shown to be fairly high.

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[146] Miilumpalo S., Vuori I., Oja P., Pasanen & Urponen H. (1997) Self-rated health status as a health measure: The predictive value of self-reported health status on the use of physician services and on mortality in the working age population. *J Clin Epidemiol* vol. 50(5), pp.517-528.

The general conclusion of the authors about the validity of the health indicators is that standardised self-reported subjective health appraisals can be used as valid measures of health in epidemiological research.

LaRue et al.[147] analyse the relationship between self-reports of health and physician's ratings in aged sample. Furthermore, they also analyse how these measures relate to longevity.

They conclude that self-reports of health are significantly correlated with ratings assigned by a physician. Furthermore, they found both measures to be predictive of differences in survival time among the younger subjects in the sample. However, none of these measures was significantly related to longevity for older subjects.

Ferraro[148] analyses the validity of self-ratings of health among the elderly. He concluded that self-ratings of health are significantly related to measures of objective health status (degree of disability and number of illnesses reported).

Menec et al.[149] analyse the relationship between self-perceptions of health and mortality. Concretely, the objectives of their study are:

- To analyse the relationship between health perception and mortality controlling not only for self-reported measures of health status, but also for objective health measures (physician visits and hospitalization).

- To extend previous research by using other outcomes measures than mortality.

They conclude that self-rated health is substantially related to mortality, independent of other 'more' objective health measures. They found also evidence of the link between positive health perceptions and control beliefs.

Wolinsky & Tierney[150] test in their analysis the *trajectory* hypothesis. This hypothesis suggest that poor self-rated health represents declining health trajectories of the respondents.

They conclude that the hypothesis is not supported by the data used in the analysis. They suggest that the results provide support for the alternative hypothesis that poor self-rated

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[147] LaRue A., Bank L., Jarvik L. & Hetland M. (1979) Health in old age: how do physicians' ratings and self-ratings compare? *Journal of Gerontology*, vol.34(5), 687-691.

[148] Ferraro K.F. (1980) Self-ratings of health among the old and the old-old. *Journal of Health and Social Behaviour*, vol.21(December), 377-383.

[149] Menec V.H., Chipperfield J.G. & Perry R.P. (1999) Self-perceptions of health: a prospective analysis of mortality, control and health. *Journal of Gerontology: PSYCHOLOGICAL SCIENCES*, vol. 54B(2), P85-P93.

[150] Wolinsky F.D. & Tierney W.M. (1998) Self-rated health and adverse health outcomes: an exploration and refinement of the trajectory hypothesis. *Journal of Gerontology: SOCIAL SCIENCES*, vol.53B(6), S336-S340.

health and declining health trajectory appear to have independent and complementary effects on adverse health outcomes.

Schwarze et al.[151] also tested the *trajectory* hypothesis in their study. They first analysed the relationship between self-rated health and mortality for Germany and concluded that like the international evidence, self-rated health is a valid predictor of mortality.

Then, after exploring the trajectory hypothesis, they conclude that the relationship between self-rated health and mortality is not a simple reflection of declining health trajectories.

Maddox & Douglas[152] carry out a longitudinal investigation of the relationship between self and physician's assessment of general health status.

They conclude that there is a persistent, positive congruence of self and physician's ratings of health. They also found that whenever there was incongruity between these two measures, the tendency of the individuals was to over-estimate, rather than under-estimate, their health. Furthermore, substantial stability through time of both self and physician's ratings was observed.

Another result of the study is that self health rating is a better predictor of future physician's ratings than the reverse.

Mossey & Sahpiro[153] test in their analysis the hypothesis that self-rated health is a predictor of mortality independently of the 'objective health status'.

They concluded that controlling for age, sex, objective health status and residence, the associations between self rated health and early and late mortality are significant.

Idler & Benyamini[154] review twentyseven studies which analyse the relationship between self-rated health and mortality.

After their review analysis they conclude that in 23 of the 27 studies self-ratings of health reliably predict survival in populations even when known health risk factors have been accounted for.

It is also interesting to review which other covariates are introduced in the analysis of the relationship between subjective and the objective health indicators.

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[151] Schwarze J., Andersen H.H. & Anger S. (2000) Self-rated health and changes in self-rated health as predictors of mortality. First evidence from German Panel data. *DIW DP 203*.

[152] Maddox G.L. & Douglass E.B. (1973) Self-assessment of health: a longitudinal study of elderly subjects. *Journal of Health and Social Behaviour* 14(1), 87-93.

[153] Mossey J.M. & Shapiro E. (1982) Self-rated health: a predictor of mortality among the elderly. American Journal of Public Health, vol.72(8), 800-807.

[154] Idler E.L. & Benyamini Y. (1997) Self-rated health and mortality: a review of twenty-seven community studies. *Journal of Health and Social Behaviour*, vol.38 (March), 21-37.

Schneider[155] analyses which variables have a significant effect on objective health using data from the GSOEP. From their multivariate analysis he concludes that higher education is related with higher subjective responses. He also observes that the older the individual, the lower are subjective health responses. However, they no observe gender effect. The author found a significative regional effect concluding that the individuals from the new *Länder* tend to report worse health.

Some of the studies are determined by the assumption of the existence of age and gender differences in the relationship between self-perceived health and objective health indicators.

LaRue et al.[156] analyse the relationship between self-reports of health and physician's ratings in aged sample, and how these measures are related to longevity.

They conclude that both types of measures were predictive of differences in survival time among the younger subjects in the sample, but for older subjects neither of the measures was significantly related to longevity.

Ferraro[157] analyses the validity of self-ratings of health among the elderly distinguishing between different age categories.

He found that despite the old-old members of the sample (75+) were more disabled and reported more physiological disorders, they tended to report better health than the old (64-74). He also found that despite elderly females had more disability and more physiological disorders than males, they tended to report better health.

Helmer et al.[158] examine the predictive value of subjective health on mortality separately for women and men.

Their results show discrepancies between men and women in the relationship between subjective health and mortality, particularly in the middle-range categories of subjective health. While subjective health appears to be a good predictor of mortality in men, for women subjective health is not an independent predictor of mortality.

Miilunpalo et al.[159] in their analysis conclude that the association between perceived health and future mortality holds not only for the elderly but also for the middle-age population.

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[155] Schneider S. (1999) Das subjektive Gesundheitsempfinden im Lebensverlauf. *Österreichische Zeitschrift für Soziologie*. Heft 1, 47-62.

[156] LaRue A., Bank L., Jarvik L. & Hetland M. (1979) Health in old age: how do physicians' ratings and self-ratings compare? *Journal of Gerontology*, vol.34(5), 687-691.

[157] Ferraro K. F. (1980) Self-ratings of health among the old and the old-old. Journal of Health and Social Behaviour, vol.21(Dezember):377-383.

The results of the study of Jylhä et al.[160] suggest that self-rated health predicts mortality better in men than in women and it is sensitive to cultural environment.

In this direction, Lüschen et al.[161] analyse the differences in subjective health status between East- and West-Germany and between genders.

They conclude that subjective health status is not significantly different for both parts of Germany. They also conclude that east-German women have the worst self-rated health status of the groups compared.

4. Interpretations of the relationship between subjective and objective health indicators.

In the last section we reviewed what the literature tell us about the validity of subjective health indicators. The main way of analysing this validity is to test the relationship between subjective and objective health indicators. The majority of the studies concluded that subjective health indicators are valid indicators of health since they show a close relationship with other health outcomes.

In this section, we review how different authors interpret this close relationship between subjective and objective health indicators.

Menec et al.[162] suggest that the relationship between health perceptions and mortality can be explained by one (or more) of the following explanations:

- Health perceptions may reflect insights into people's health that are not captured by more objective health measures.

- Individuals who rate their health as poor may have worse health habits or may not initiate health promotion actions, precipitating in this way health problems.

- Alternatively, positive health perceptions of health may play a protective role because of the optimistic feelings.

Wolinky & Tierney[163] review the theories which explain the relationship between self-rated health and adverse health outcomes:

[158] Helmer C., Barberger-Gateau P., Letenneur L. & Dartigues J-F. (1999) Subjective health and mortality in French elderly women and men. *Journal of Gerontology: SOCIAL SCIENCES* vol.54B(2), S84-S92.

[159] Miilumpalo S., Vuori I., Oja P., Pasanen & Urponen H. (1997) Self-rated health status as a health measure: The predictive value of self-reported health status on the use of physician services and on mortality in the working age population. *J Clin Epidemiol* vol. 50(5), pp.517-528.

[160] Jylhä M., Guralnik J.M., Ferrucci L, Jokela J. & Heikkinen E. (1998) Is self-rated health comparable across cultures and genders? *Journal of Gerontology: SOCIAL SCIENCES*, vol.53B(3), S144-S152.

[161] Lüschen G., Geling O., Janßen C., Kunz G. & Von Dem Knesebeck (1997) *Soc. Sci. Med.* vol.44(9), pp 1313-1323.

[162] Menec V.H., Chipperfield J.G. & Perry R.P. (1999) Self-perceptions of health: a prospective analysis of mortality, control and health. *Journal of Gerontology: PSYCHOLOGICAL SCIENCES*, vol. 54B(2), P85-P93.

- The *sponge* hypothesis suggests that self-rated health is a more inclusive measure of health status, which includes aspects that other measures fail to include.

- The *trajectory* hypothesis suggests that poor self-rated health reflects self-assessments of declining health trajectories.

- The *intervening* hypothesis suggests that self-rated health influences health behaviors which in turn affect health outcomes.

- The *resource* hypothesis suggest that self-rated health reflects the availability of internal or external supports which in turn affect health outcomes.

Mossey and Shapiro[164] also suggest several interpretations of the association between self rated health and mortality:

- Self rated health may contribute to the risk of mortality because it represents a good indicator of psychological well-being.

- Positive health habits may lead to a more positive self-ratings of health than expected from objective assessments. Thereby, the reduction in mortality risk may be due in part to these positive health habits more than to self-ratings.

- Self-rated health may be almost entirely determined by the person's emotional situation, once it has been controlled for the effect of objective health. Therefore, the higher mortality risk for individuals who declare poor health may reflect the importance of emotional problems in determining mortality.

Idler & Benyamini[165] suggest the following possible interpretations after reviewing more than 20 studies which confirm the association between self-rated health and mortality:

- Self-rated health may be a more inclusive and accurate measure of health status and health risk than other measures used because:

  - Self-rated health captures the full array of illnesses that a person has, and even symptoms of diseases that have not been diagnosed yet.

  - Self-ratings of health may represent complex human judgements about the severity of current illnesses.

  - Self-ratings may reflect family history.

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[163] Wolinsky F.D. & Tierney W.M. (1998) Self-rated health and adverse health outcomes: an exploration and refinement of the trajectory hypothesis. *Journal of Gerontology: SOCIAL SCIENCES*, vol.53B(6), S336-S340.

[164] Mossey J.M. & Shapiro E. (1982) Self-rated health: a predictor of mortality among the elderly. American Journal of Public Health, vol.72(8), 800-807.

[165] Idler E.L. & Benyamini Y. (1997) Self-rated health and mortality: a review of twenty-seven community studies. *Journal of Health and Social Behaviour*, vol.38 (March), 21-37.

- Self-rating may be a dynamic evaluation judging trajectory more than current level of health (*trajectory* hypothesis).

- Self-rated health may influence health behaviors and in turn affect health status:

  - Poor perceptions may lead to less prevention.

  - Poor perceptions may lead the individual not to follow screening recommendations, medication and treatment.

- Self-rated health may reflect the presence or absence of resources which can determine decline in health:

  - The external social environment may provide such resources,

  - Self-rated health may also reflect within-person resources.

5. Health reporting behavior

In this section we first present the health responding behavior model developed by Kerkhofs and Lindeboom[166]. Next, we apply this model using GSOEP data in order to analyse the response behaviour of unemployed individuals.

The authors developed an interesting framework in order to analyse whether or not there is systematic miss-reporting in subjective health assessments.

Under the authors' point of view there are two forms of endogeneity in the relationship between subjective health and labour status.

First, true health may be related to labour market status due to:

- a reverse causal relationship between the two variables, or to

- an indirect relationship through unobservables.

And second, there may be endogeneity between the two variables due to a problem of miss-reporting. The subjective health response of an individual may depend on his labour status.

As the authors point out inactivity is socially better accepted when it is caused by health problems. Therefore, it may occur that non-working individuals report lower levels of subjective health in order to socially justify their status.

Kerkhofs and Lindeboom developed model of health reporting which deals with this second type of endogeneity.

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[166] Kerkhofs M. and Lindeboom M. (1995) Subjective health measures and state dependent reporting errors. *Health Economics* vol 4: 221-235.
 Kerkhofs M. and Lindeboom M. (2002) Health and work of the elderly: subjective health measures, reporting errors and the endogenous relationship between health and work. *IZA*. Discussion Paper n. 457.

In this model, the true value of health (that we don't observe) is represented by H^* and the reported health measure is represented by H^S. H^O represents objective health status and U represents labour status.

Assumption 1: the conditional probability distribution of H^* conditional on H^O, X_1 and U is independent of U.

$$pdf(H^* / H^O, X_1, U) \cong pdf(H^* / H^O, X_1)$$

Where X_1 represents exogenous variables.

With this assumption the first type of endogeneity is ruled out from the model. This endogeneity is represented by the relationship between H^* and U. But with the assumption we state that any effect of U on H^* (first type of endogeneity) is sufficiently captured by H^O.

The model can then be specified as:

$$H^* = f_1(H^O, X_1, \varepsilon_1; \omega_1) \quad (1)$$

$$H^S = f_2(H^*, U, X_2, \varepsilon_2; \omega_2) \quad (2)$$

Where ε_1 and ε_2 are random disturbances and X_1 and X_2 are exogenous variables. f_1 describes the relationship between true health and its instruments and f_2 represents reporting behavior.

Since we don't observe H^* we substitute the first equation into the second and obtain:

$$H^S = f_3(H^O, U, X, \varepsilon; \omega) \quad (3)$$

If assumption 1 holds, then the effect of labour status U on subjective health H^S in eq. (3) must come exclusively from reporting errors.

We use this framework in order to analyse response behaviour of unemployed using GSOEP data. We want to analyse with GSOEP data whether or not unemployed tend to report lower levels of health satisfaction even after controlling for objective health indicators and other exogenous variables.

One reason to think that unemployed may miss-report is that they may want to justify socially their inactivity through health reasons.

We first, regress health satisfaction on different exogenous variables (age, age square, family status, education), on a dummy variable which takes the value 1 if the individual is unemployed and 0 otherwise and on a set of objective measures of health that where introduced in GSOEP questionnaires in the year 2002 an which are listed below:

- Number of doctor visits in the last 3 months (this variable was already introduced in 1988)

- Problems due to the state of health in ascending stairs (greatly, slightly, not at all)

- Problems due to the state of health in coping with other tiring everyday tasks (greatly, slightly, not at all)

- Frequency of rushed or pressed for time feelings in the last 4 weeks (always, often, sometimes, almost never, never)

- Frequency of run-down/melancholy feelings in the last 4 weeks (always, often, sometimes, almost never, never)

- Frequency of relax and well-balance feelings in the last 4 weeks (always, often, sometimes, almost never, never)

- Frequency of using up a lot of energy in the last 4 weeks (always, often, sometimes, almost never, never)

- Frequency of strong physical pains in the last 4 weeks (always, often, sometimes, almost never, never)

- Frequency of less achievement at work or in everyday tasks due to physical health problems in the last 4 weeks (always, often, sometimes, almost never, never)

- Frequency of limitation at work or in everyday tasks due to physical health problems in the last 4 weeks (always, often, sometimes, almost never, never)

- Frequency of less achievement at work or in everyday tasks due to mental or emotional problems in the last 4 weeks (always, often, sometimes, almost never, never)

- Frequency of carrying out less thoroughly work or everyday tasks due to mental or emotional problems in the last 4 weeks (always, often, sometimes, almost never, never)

- Frequency of social limitation due to physical or mental health problems in the last 4 weeks (always, often, sometimes, almost never, never)

These objective health indicators and the other explanatory variables included in the model are described in table 2.

In tables 3 and 4 we present OLS estimations and ordered probit estimations of this model for GSOEP data of the 19th wave (year 2002).

We limit the sample to individuals with ages between 21 and 65 years old and we estimate the model separately for men and for woman (tables 3 and 4). After the age selection we have in our sample 7.307 men and 7.639 women.

We begin by the analysis of the results of table 3. The variable of interest in our analysis is unemployment. We want to see whether or not being unemployed has an effect on health satisfaction reports. After controlling for age, education, family status, and objective health indicators, unemployed men report lower health satisfaction than not unemployed men.

This negative effect of unemployment on health satisfaction reports comes (see equation (3)) exclusively from reporting behaviour of the individuals.

Unemployed men may have incentives to justify their inactivity through lower levels of health satisfaction.

Most objective health indicators included in the model are significant. The number of doctor visits in the last 3 months is significant (for OLS and for Ordered Probit) and is negatively related with health satisfaction. In other words, the greater the number of times that a man was by the doctor the smaller is the health satisfaction level that this individual reports.

Taking as a reference category having great problems in ascending stairs due to health problems, having slight problems or not at all problems are positively related with health satisfaction.

Taking as a reference category having great problems with coping with tiring everyday tasks due to health problems, having slight or not at all problems are also positively associated with health satisfaction. In other words the lesser problems in coping with tiring everyday tasks due to health problems the higher report value of health satisfaction.

It is also interesting to notice that social limitation due to health problems is significant. The less often an individual feels himself socially limited due to health problems the higher are the health satisfaction values that he reports. In the first section of this chapter we remarked that subjective health indicators are desirable since they are more global than objective indicator. In this case we see how health satisfaction does include social aspects.

Health satisfaction includes also emotional and psychological aspects. In table 3 we can observe that the less often an individual felt melancholy the higher is his health satisfaction report.

Summarising, after analysing table 3 we can conclude that unemployed men tend to report lower levels of health satisfaction than not unemployed men even after controlling for age, education, family status, and a long list of objective health indicators.

Furthermore, we observe that most of the objective health indicators are significant, this result supports the argument that subjective health indicators are valid since they have a close relationship with objective health.

In table 4 we present the results of the estimation of the model for the women sub-sample. In this case, unemployed women also tend to report lower levels of health satisfaction even after controlling for all the explanatory variables specified in table 2. Again, women may have an incentive to justify their inactivity by reporting lower levels of health.

In the case of the women, even more objective health indicators are significant, supporting the idea of health satisfaction as a global indicator.

After analysing the results of the estimation of the health reporting model (table 3 and 4) we conclude that most of the objective health indicators are significant which is a good argument for the validity of health satisfaction as health indicator.

However, we also observe that individuals who are unemployed tend to report lower levels of health satisfaction than individuals who are not unemployed. This bias introduced by miss-reporting of unemployed individuals can cause problems in the analysis of the causal relationship between unemployment and health.

Therefore, we want to analyse deeply this reporting behaviour. The objective of this second step is to see whether or not unemployed individuals who report low levels of health satisfaction, already reported lower levels of health satisfaction before becoming unemployed. If this would be the case, miss-reporting would not be caused by unemployment but by the fact that these individuals have a tendency to report low levels of satisfaction even before unemployment.

For this analysis we need to have observations over different waves. As we remarked above, the list of objective variables used in the past analysis were introduced in GSOEP questionnaires in the year 2002. Therefore, is not possible to do a longitudinal analysis using this information.

For the longitudinal analysis we use data from 9 GSOEP waves, from the year 1992 till the year 2000. The objective health indicators that we use for the analysis are number of doctor visits in the last 3 months, and the number of nights spent in the hospital.

Again, we select only individuals with ages between 21 and 65. We run our model separately for men and for women. After the age selection we have in our sample 28.222 men and 29.120 women.

First, in tables 6 and 7 we present the results of the estimation of the effect of unemployment on miss-reporting and next (in Tables 9 and 10) we present the results of the estimation of the effect of future unemployment on miss-reporting.

With this second model we want to analyse whether or not individuals whose health satisfaction reports are affected by unemployment already tended to report lower values of health satisfaction before the unemployment experience.

In tables 6a and 6b we present OLS estimations and ordered probit estimations for the men sub-sample. In this case, as we already saw in tables 3 and 4, being unemployed affects reporting behaviour. Concretely, unemployed tend to report lower levels of health satisfaction than not unemployed even after controlling for age, education, family status and objective health measures.

The two objective health measures: number of doctor visits and number of nights in the hospital are also significant. They are both negatively related with health satisfaction. The higher the number of doctor visits the lower the health satisfaction report. And the higher the number of nights in the hospital, the lower the health satisfaction report.

In tables 7a and 7b we present the same estimations for the women sub-sample. In this case unemployed women also tend to report lower values of health satisfaction even after controlling for age, age square, education, family status and objective health measures.

In tables 9 and 10, we present the results of the estimation of the effect of future unemployment on health satisfaction reports. We select individuals who are working in t and we analyse whether or not the individuals who will suffer unemployment in the next period already report lower levels of health satisfaction in t.

In tables 9a and 9b we present respectively OLS and ordered probit estimations for men. We observe in both tables that future unemployment is significant and negative. This means that individuals who are working in t but who will suffer unemployment in t+1 tend to report lower levels of health satisfaction. In other words, these individuals were already 'pessimists' in their health satisfaction reports even before unemployment.

If we compare the coefficients of unemployment in t (table 6a) and unemployment in t+1 (table 9a) we do not observe big differences between the values[167]. By comparing the

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[167] We compare OLS coefficients and not ordered probit coefficients because these ones are not directly comparable. One possibility would be to compare the marginal effects. However, due to the multiple-outcome feature of the ordered probit method, Stata computes marginal effects separately for each outcome which would increase the dimensions of our tables in an undesirable way.

confidence intervals (which measure how close the estimated values are to the true values) we observe that they overlap.

This means that unemployed have a similar miss-reporting behaviour before and during unemployment.

The objective health variables were again significant, and with the expected (negative) sign.

We obtain very similar results for the women sub-sample (tables 10a and 10b). The coefficient for future unemployment is significant and negative. This means, that women who are working at t but who will suffer unemployment in t+1 tend to report already in t lower levels of health satisfaction.

The coefficients of unemployment in t (table 7a) and of unemployment in t+1 (table 10a) present similar values. And the respective confidence intervals overlap, indicating again that women miss-reporting behaviour is similar before and during unemployment.

Summarising, we have first analysed the effect of unemployment on health reporting behavior. We found a negative effect of unemployment on health reporting. Unemployed tend to report lower levels of health satisfaction even controlling for objective health and other exogenous variables.

In a second step, we have analysed whether this miss-reporting behaviour is really due to unemployment or whether individuals who report lower levels of health satisfaction when unemployed already tended to report them before the unemployment experience. We found that future unemployed miss-reported in a similar way even before the unemployment experience.

Since individuals are consistent in their miss-reporting, by analysing health satisfaction changes the miss-reporting bias is removed from the analysis.

Finally, we estimate the same model but introducing additionally unemployment in t+2 (table 12 and 13) . Unemployment in t+2 is significant and negative for men and women.

By comparing the estimated coefficients (for the men sub-sample) of unemployment in t (table 6a) and unemployment in t+2 (table 12a) we observe again that there is not a big difference between the values, and that the confidence intervals overlap. This means that individuals are consistent in their miss-reporting even if we compare reports made with two years of difference. Individuals who are employed in t, did already miss-report in a similar way even two years before the unemployment experience.

We obtain the same result if we compare the estimations for the women sub-sample. By comparing tables 7a and 13a we conclude that women are also consistent in their miss-reporting behaviour.

These results support the idea that individuals tend to miss-report even before the unemployment experience. In this case, individuals tend to report lower levels of health satisfaction even 2 periods (years) before the unemployment experience.

6. Conclusions

In this chapter we reviewed several aspects of the subjective health indicators:

- what do these indicators really indicate,

- which are their advantages with respect to objective indicators of health,

- whether or not these indicators are valid.

We found evidence in the literature of the validity of the subjective health indicators. Mainly funded in their high correlation with objective health indicators.

Furthermore, several explanations of the close relationship between subjective and objective indicators have been reviewed.

Additionally, we used GSOEP data to analyse health satisfaction reporting behavior. We applied the health report model developed by Kerkhofs and Lindeboom[168] in order to analyse whether or not unemployed tend to report lower levels of health satisfaction even after controlling for objective health measures and other exogenous variables.

After this analysis, we concluded that unemployment does have an effect on health reporting. Unemployed tend to report lower levels of health satisfaction, may be due to the necessity of justifying their inactivity.

In a second step, we analysed whether or not unemployed already reported low levels of health satisfaction even before unemployment. The results from this analysis showed that unemployed already miss-reported even before unemployment.

In other words, individuals are consistent in their reporting behavior through time. This fact reduces the problem of bias in the analysis of the 'causal' relationship between unemployment and health. In the analysis of the relationship between unemployment and health satisfaction which is presented in a following chapter, we analyse health satisfaction changes, overcoming in this way the problem of bias introduced by the miss-reporting behaviour.

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[168] Kerkhofs M. and Lindeboom M. (1995) Subjective health measures and state dependent reporting errors. *Health Economics* vol 4: 221-235.

Summarising, in this chapter we have reviewed which are the advantages of using subjective health indicators. They are easy to collect and furthermore they are more global than objective health indicators including biological, social and emotional aspects. We have also reviewed several studies which analyse the validity of these indicators.

Furthermore, we have tested empirically the validity of health satisfaction as health indicator for the analysis of the relationship between unemployment and health. We concluded that although unemployed tend to report lower levels of health satisfaction, they do so even before unemployment. Therefore, by analysing changes in health satisfaction the miss-reporting bias is removed from the analysis.

Kerkhofs M. and Lindeboom M. (2002) Health and work of the elderly: subjective health measures, reporting errors and the endogenous relationship between health and work. *IZA*. Discussion Paper n. 457.

TABLES

TABLE 1. HEALTH SATISFACTION FREQUENCIES (How satisfied are you with your health?).

Value	1984	1987	1990W	1993	1997	1999
0 (Very Dissatisfied)	3,45%	2,06%	1,95%	2,09%	1,44%	1,92%
1	1,77%	1,58%	1,51%	1,37%	1,55%	1,33%
2	3,07%	2,97%	2,69%	3,24%	3,07%	3,20%
3	4,24%	4,18%	4,96%	4,97%	6,21%	5,94%
4	4,36%	4,80%	5,43%	5,74%	7,20%	6,25%
5	15,40%	15,19%	15,05%	14,86%	14,22%	13,89%
6	6,63%	9,55%	9,93%	10,55%	10,32%	10,76%
7	12,17%	14,99%	15,21%	15,84%	17,07%	16,05%
8	17,42%	21,07%	22,64%	22,23%	22,00%	22,31%
9	11,24%	10,91%	10,85%	9,91%	9,87%	10,75%
10 (Very satisfied)	20,11%	12,57%	9,60%	8,88%	6,65%	7,09%
	n=12.224	n=10.498	n=9.504	n=13.146	n=13.250	n=14.044

Weighted frequencies. Non-weighted number of observations.   Source: GSOEP

TABLE 2: VARIABLES DESCRIPTION

Variables	Description
age	Age
age2	Age square
Family Status:	
- famstatus1	married – living together
- famstatus2	married – separated
- famstatus3	single
- famstatus4	divorced
- famstatus5	widowed
Years of Education[169]:	
- eduzeit1	7 years of education
- eduzeit2	8 years of education
- eduzeit3	9 years of education
- eduzeit4	10 years of education
- eduzeit5	11 years of education
- eduzeit6	12 years of education
- eduzeit7	13 years of education
- eduzeit8	14 years of education
- eduzeit9	15 years of education
- eduzeit10	16 years of education
- eduzeit11	17 years of education
- eduzeit12	18 years of education
Number of doctor visits in the last 3 months:	
- doctorvisits	
Problems due to the state of health in ascending stairs:	
- hstairs1	greatly
- hstairs2	slightly
- hstairs3	not at all
Problems due to the state of health in coping with other tiring everyday tasks:	
- heffort1	greatly
- heffort2	slightly
- heffort3	not at all
Frequency of rushed or pressed for time feelings in the last 4 weeks:	
- stress4w1	always
- stress4w2	often
- stress4w3	sometimes
- stress4w4	almost
- stress4w5	never
Frequency of run-down/melancholy feelings in the last 4 weeks:	
- melancholy4w1	always
- melancholy4w2	often
- melancholy4w3	sometimes
- melancholy4w4	almost
- melancholy4w5	never
Frequency of relax and well-balance feelings in the last 4 weeks:	
- quiet4w1	always
- quiet4w2	often
- quiet4w3	sometimes
- quiet4w4	almost
- quiet4w5	never

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[169] The education information is from year 2001 due to the fact that this variable was still not generated for the year 2002 at the moment of the estimation of the health report model.

Frequency of using up a lot of energy in the last 4 weeks:	
- energie4w1	always
- energie4w2	often
- energie4w3	sometimes
- energie4w4	almost
- energie4w5	never
Frequency of strong physical pains in the last 4 weeks:	
- pain4w1	always
- pain4w2	often
- pain4w3	sometimes
- pain4w4	almost
- pain4w5	never
Frequency of less achievement at work or in everyday tasks due to physical health problems in the last 4 weeks:	
- lessperform1	always
- lessperform2	often
- lessperform3	sometimes
- lessperform4	almost
- lessperform5	never
Frequency of limitation at work or in everyday tasks due to physical health problems in the last 4 weeks:	
- flimitation1	always
- flimitation2	often
- flimitation3	sometimes
- flimitation4	almost
- flimitation5	never
Frequency of less achievement at work or in everyday tasks due to mental or emotional problems in the last 4 weeks:	
- plimitation1	always
- plimitation2	often
- plimitation3	sometimes
- plimitation4	almost
- plimitation5	never
Frequency of carrying out less thoroughly work or everyday tasks due to mental or emotional problems in the last 4 weeks:	
- plesscare1	always
- plesscare2	often
- plesscare3	sometimes
- plesscare4	almost
- plesscare5	never
Frequency of social limitation due to physical or mental health problems in the last 4 weeks:	
- sozlimitation1	always
- sozlimitation2	often
- sozlimitation3	sometimes
- sozlimitation4	almost
- sozlimitation5	never
Unemployed:	
- dunemployed	(0 no unemployed, 1 unemployed)

TABLE 3. EFFECT OF UNEMPLOYMENT ON HEALTH SATISFACTION MISS-REPORTING.

MEN.

Variables	OLS		Ordered Probit	
	Coef.	Robust std. Errors	Coef.	Std. Errors
age	**-0.08747******	**(0.01276)**	**-0.06228******	**(0.00841)**
age2	**0.00081******	**(0.00014)**	**0.00057******	**(0.00009)**
famstatus2	-0.22918	(0.16367)	-0.10062	(0.08822)
famstatus3	**-0.10722***	**(0.0558)**	-0.05690	(0.03714)
famstatus4	-0.09942	(0.08128)	-0.04804	(0.04992)
famstatus5	**-0.34826***	**(0.17815)**	**-0.23888****	**(0.11620)**
eduzeit2	**0.63150****	**(0.26465)**	**0.38378****	**(0.19127)**
eduzeit3	0.12013	(0.15557)	0.05169	(0.09729)
eduzeit4	0.18877	(0.14371)	0.08366	(0.09020)
eduzeit5	0.22279	(0.14464)	0.10347	(0.09096)
eduzeit6	0.14776	(0.15224)	0.05081	(0.09576)
eduzeit7	0.11724	(0.15500)	0.03563	(0.09918)
eduzeit8	0.12324	(0.16235)	0.02599	(0.10713)
eduzeit9	0.17206	(0.16162)	0.08462	(0.10419)
eduzeit10	-0.09658	(0.17834)	-0.09742	(0.11327)
eduzeit11	-0.11860	(0.40644)	-0.17139	(0.25121)
eduzeit12	0.18781	(0.15110)	0.07646	(0.09714)
doctorvisits	**-0.05879******	**(0.00603)**	**-0.03801******	**(0.00321)**
hstairs2	**0.30842****	**(0.12926)**	**0.15364****	**(0.07035)**
hstairs3	**0.68340******	**(0.13782)**	**0.38487******	**(0.07534)**
heffort2	**0.47106******	**(0.10321)**	**0.25069******	**(0.06051)**
heffort3	**0.86827******	**(0.11272)**	**0.52640******	**(0.06711)**
stress4w2	-0.13996	(0.10303)	**-0.10139***	**(0.06049)**
stress4w3	-0.13527	(0.10455)	-0.08017	(0.06122)
stress4w4	**-0.20836***	**(0.11053)**	-0.13425	(0.06605)
stress4w5	**-0.22545***	**(0.12080)**	**-0.14583****	**(0.07225)**
melancholy4w2	0.28413	(0.24294)	0.17169	(0.12394)
melancholy4w3	**0.57446****	**(0.24336)**	**0.33064*****	**(0.12543)**
melancholy4w4	**0.75256*****	**(0.24685)**	**0.45658******	**(0.12740)**
melancholy4w5	**0.87081******	**(0.24930)**	**0.55505******	**(0.12912)**
quiet4w2	-0.10435	(0.08281)	-0.08550	(0.05809)
quiet4w3	**-0.17166***	**(0.09148)**	**-0.12927****	**(0.06307)**
quiet4w4	**-0.33264*****	**(0.11011)**	**-0.21735*****	**(0.07214)**
quiet4w5	**-0.28148***	**(0.16157)**	**-0.19132***	**(0.10245)**
energie4w2	**-0.14974***	**(0.08798)**	**-0.15028****	**(0.06463)**
energie4w3	**-0.50850******	**(0.09037)**	**-0.41721******	**(0.06522)**
energie4w4	**-0.84272******	**(0.10615)**	**-0.61228******	**(0.07213)**
energie4w5	**-0.82670******	**(0.15275)**	**-0.59474******	**(0.09427)**
pain4w2	0.02355	(0.26364)	-0.01758	(0.11661)
pain4w3	0.38730	(0.26568)	0.16440	(0.11688)
pain4w4	**0.71992*****	**(0.26703)**	**0.36844*****	**(0.11862)**
pain4w5	**1.11550******	**(0.26711)**	**0.67118******	**(0.11960)**
lessperform2	0.06837	(0.31006)	0.02041	(0.14808)
lessperform3	0.33272	(0.31962)	0.16432	(0.15545)
lessperform4	0.39579	(0.32374)	0.20631	(0.15873)
lessperform5	0.50436	(0.32724)	**0.29277***	**(0.16145)**
flimitation2	-0.06147	(0.25821)	-0.03747	(0.13019)
flimitation3	0.03596	(0.26287)	-0.00864	(0.13708)

flimitation4	0.41736	(0.27130)	0.20310	(0.14209)
flimitation5	**0.48259***	**(0.27799)**	**0.26036***	**(0.14612)**
plimitation2	-0.43334	(0.35952)	-0.23104	(0.20298)
plimitation3	-0.32457	(0.35987)	-0.18372	(0.20503)
plimitation4	-0.35048	(0.36284)	-0.19623	(0.20744)
plimitation5	-0.16770	(0.36405)	-0.07624	(0.20954)
plesscare2	0.06104	(0.51667)	0.05320	(0.24170)
plesscare3	0.32791	(0.51105)	0.24026	(0.23883)
plesscare4	0.30434	(0.50913)	0.21558	(0.24007)
plesscare5	0.26114	(0.50982)	0.18330	(0.24127)
sozlimitation2	**0.79368****	**(0.38412)**	**0.46388*****	**(0.17423)**
sozlimitation3	**0.71366***	**(0.37743)**	**0.41183****	**(0.17269)**
sozlimitation4	**0.71346***	**(0.37708)**	**0.39356****	**(0.17280)**
sozlimitation5	**0.71987***	**(0.37779)**	**0.40677****	**(0.17275)**
dunemployed	**-0.20260*****	**(0.07514)**	**-0.12141*****	**(0.04493)**
cons	5.52478	(0.56468)		

	N: 7.307 F-test : 97.93**** R-Squared: 0,47	N: 7.307 Log-Likelihood: -12921.742 Likelihood-Ratio chi2: 4396.07**** Pseudo R2 (McFaden): 0.1454

p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Men age>=21 and age<=65. Year 2002.

TABLE 4. EFFECT OF UNEMPLOYMENT ON HEALTH SATISFACTION MISS-REPORTING.

WOMEN.

Variables	OLS		Ordered Probit	
	Coef.	Robust Std. Errors	Coef.	Std. Errors
age	**-0,05448******	**(0,01271)**	**-0,03913******	**(0,00835)**
age2	**0,00044***	**(0,00014)**	**0,00031***	**(0,00009)**
famstatus2	0,20540	(0,14587)	0,13865	(0,08604)
famstatus3	-0,09352	(0,05916)	-0,04990	(0,03928)
famstatus4	-0,07965	(0,06923)	-0,04415	(0,04323)
famstatus5	**0,22524****	**(0,10558)**	**0,16024****	**(0,06582)**
eduzeit2	-0,47038	(0,37865)	-0,30506	(0,23493)
eduzeit3	0,09787	(0,14842)	0,04550	(0,08928)
eduzeit4	0,03317	(0,14414)	0,00498	(0,08622)
eduzeit5	0,15323	(0,14388)	0,08437	(0,08634)
eduzeit6	0,11183	(0,14777)	0,05103	(0,08928)
eduzeit7	0,06323	(0,15892)	0,02314	(0,09717)
eduzeit8	0,14478	(0,16577)	0,06733	(0,10170)
eduzeit9	0,15705	(0,16488)	0,08908	(0,10213)
eduzeit10	0,12772	(0,17612)	0,04799	(0,11533)
eduzeit11	-0,63145	(0,49453)	-0,51997	(0,37288)
eduzeit12	0,13490	(0,15533)	0,05764	(0,09569)
doctorvisits	**-0,05455******	**(0,00644)**	**-0,03528******	**(0,00293)**
hstairs2	**0,46402******	**(0,10579)**	**0,25633******	**(0,06114)**
hstairs3	**0,85215******	**(0,11202)**	**0,49402******	**(0,06591)**
heffort2	**0,32744******	**(0,09103)**	**0,17184***	**(0,05421)**
heffort3	**0,63076******	**(0,10076)**	**0,39455******	**(0,06113)**
stress4w2	0,12495	(0,09901)	0,07377	(0,05805)
stress4w3	0,00682	(0,10027)	0,00650	(0,05920)
stress4w4	0,01643	(0,10767)	0,02165	(0,06506)
stress4w5	0,13317	(0,11754)	0,11683	(0,07238)
melancholy4w2	0,23440	(0,21569)	0,16273	(0,10752)
melancholy4w3	**0,41483***	**(0,21940)**	**0,26684****	**(0,11062)**
melancholy4w4	**0,55294****	**(0,22284)**	**0,37023***	**(0,11364)**
melancholy4w5	**0,53588****	**(0,22612)**	**0,37883***	**(0,11713)**
quiet4w2	-0,01632	(0,08523)	-0,01739	(0,06256)
quiet4w3	**-0,15534***	**(0,09304)**	-0,10751	(0,06704)
quiet4w4	**-0,25196****	**(0,10918)**	**-0,15934****	**(0,07409)**
quiet4w5	-0,08150	(0,15850)	-0,04853	(0,10149)
energie4w2	**-0,34706******	**(0,09800)**	**-0,29064******	**(0,07378)**
energie4w3	**-0,55445******	**(0,10026)**	**-0,44866******	**(0,07435)**
energie4w4	**-0,80712******	**(0,11130)**	**-0,60213******	**(0,07930)**
energie4w5	**-0,86492******	**(0,15105)**	**-0,62744******	**(0,09718)**
pain4w2	**0,38401***	**(0,21016)**	**0,20684***	**(0,10661)**
pain4w3	**0,83225******	**(0,22010)**	**0,44462******	**(0,10870)**
pain4w4	**1,19752******	**(0,22278)**	**0,67215******	**(0,11064)**
pain4w5	**1,57408******	**(0,22542)**	**0,95011******	**(0,11233)**
lessperform2	0,45108	(0,29440)	**0,27536***	**(0,14695)**
lessperform3	0,63135	(0,30232)	**0,36739****	**(0,15409)**
lessperform4	**0,80022***	**(0,30748)**	**0,48076***	**(0,15764)**
lessperform5	**0,87201***	**(0,31228)**	**0,53737***	**(0,16095)**
flimitation2	0,29520	(0,26176)	0,15857	(0,13351)
flimitation3	**0,55351****	**(0,26695)**	**0,29042****	**(0,13915)**
flimitation4	**0,65685****	**(0,27439)**	**0,33821****	**(0,14376)**
flimitation5	**0,79290***	**(0,27902)**	**0,45463***	**(0,14738)**

plimitation2	0,21570	(0,47577)	0,15670	(0,21137)
plimitation3	0,22366	(0,47611)	0,16038	(0,21060)
plimitation4	0,29475**	(0,47793)	0,19613	(0,21270)
plimitation5	0,35447	(0,48167)	0,23830	(0,21479)
plesscare2	-0,19161	(0,57606)	-0,14253	(0,23154)
plesscare3	-0,07766	(0,57428)	-0,08971	(0,22798)
plesscare4	-0,07275	(0,57401)	-0,08365	(0,22852)
plesscare5	-0,09535	(0,57665)	-0,11915	(0,23021)
sozlimitation2	0,32774	(0,31017)	0,19210	(0,15039)
sozlimitation3	0,50819	(0,31273)	**0,30063****	**(0,14899)**
sozlimitation4	**0,65364****	**(0,31288)**	**0,37868****	**(0,15019)**
sozlimitation5	**0,75383****	**(0,31384)**	**0,45462*****	**(0,15020)**
dunemployed	**-0,16053****	**(0,06750)**	**-0,10702****	**(0,04420)**
cons	**3,88920******	**(0,53997)**		
	N: 7.639		N: 7.639	
	F-test : 102.71****		Log-Likelihood: -13525.389	
	R-Squared: 0,4760		Likelihood-Ratio chi2: 4563.38 ****	
			Pseudo R2 (McFaden): 0.1443	

* p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Women age>=21 and age<=65. Year 2002.

TABLE 5: VARIABLES DESCRIPTION

Variables	Description
age	Age
age2	Age square
Family Status:	
- marstatus1	married – living together
- marstatus2	married – separated
- marstatus3	single
- marstatus4	divorced
- marstatus5	widowed
Number of doctor visits in the last 3 months:	
- doctorvisits	
Number of nights in the hospital in the present year:	
- nigthshosp	
Unemployed:	
- dunemployed	(0 no unemployed, 1 unemployed)

TABLE 6a: EFFECT OF UNEMPLOYMENT ON HEALTH SATISFACTION MISS-REPORTING.

OLS ESTIMATIONS. MEN.

Variables	OLS			
	Coef.	Robust Std. Errors	95% Conf. Interval	
age	-0,11360****	(0,00834)	-0,12995	-0,09725
age2	0,00080****	(0,00010)	0,00061	0,00099
educat2	0,01565	(0,03434)	-0,05166	0,08296
educat3	0,34461****	(0,03899)	0,26820	0,42103
marstatus1	0,13886****	(0,03359)	0,07302	0,20471
marstatus2	-0,01844	(0,09891)	-0,21230	0,17542
marstatus4	-0,02109	(0,06267)	-0,14393	0,10175
marstatus5	-0,02170	(0,14922)	-0,31419	0,27078
doctorvisits	-0,13879****	(0,00637)	-0,15126	-0,12631
nigthshosp	-0,02712****	(0,00211)	-0,03126	-0,02297
dunemployed	-0,37453****	(0,04280)	-0,45843	-0,29064
cons	10,20866****	(0,15971)	9,89561	10,52171
N: 28.222				
F-test : 377.11****				
R-Squared: 0,1977				

* p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP

Dependent Variable: Health Satisfaction (0-10)

Sample: Men age>=21 and age<=65. Years 1992-2000 (pooled).

TABLE 6b: EFFECT OF UNEMPLOYMENT ON HEALTH SATISFACTION MISS-REPORTING. ORDERED PROBIT ESTIMATIONS. MEN.

Variables	Ordered Probit		
	Coef.	Std. Errors	95% Conf. Interval
age	**-0,06867******	**(0,00446)**	**-0,07741** **-0,05993**
age2	**0,00051******	**(0,00005)**	**0,00042** **0,00061**
educat2	-0,01745	(0,01725)	-0,05126 0,01636
educat3	**0,14399******	**(0,02061)**	**0,10360** **0,18438**
marstatus1	**0,06714******	**(0,01825)**	**0,03137** **0,10291**
marstatus2	-0,01694	(0,05077)	-0,11646 0,08257
marstatus4	-0,0033	(0,03215)	-0,06632 0,05973
marstatus5	0,02315	(0,06603)	-0,10627 0,15257
doctorvisits	**-0,07001******	**(0,00153)**	**-0,07300** **-0,06701**
nigthshosp	**-0,01384******	**(0,00088)**	**-0,01556** **-0,01211**
dunemployed	**-0,18888******	**(0,02119)**	**-0,23041** **-0,14736**
N: 28.222			
Log-Likelihood: -55532.159			
Likelihood-Ratio chi2: 5762.63****			
Pseudo R2 (McFaden): 0.0493			

* p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP

Dependent Variable: Health Satisfaction (0-10)

Sample: Men age>=21 and age<=65. Years 1992-2000 (pooled).

TABLE 7a: EFFECT OF UNEMPLOYMENT ON HEALTH SATISFACTION MISS-REPORTING.
OLS ESTIMATIONS . WOMEN.

Variables	OLS		
	Coef.	Robust Std. Errors	95% Conf. Interval
age	**-0,10256******	**(0,00815)**	**-0,11854** **-0,08658**
age2	**0,00066******	**(0,00009)**	**0,00048** **0,00084**
educat2	**0,13291******	**(0,02940)**	**0,07529** **0,19053**
educat3	**0,28513******	**(0,03626)**	**0,21406** **0,35619**
marstatus1	**0,20493******	**(0,03656)**	**0,13328** **0,27658**
marstatus2	**0,21314****	**(0,09024)**	**0,03625** **0,39002**
marstatus4	0,07277	(0,05801)	-0,04092 0,18647
marstatus5	**0,23584***	**(0,07313)**	**0,09251** **0,37917**
doctorvisits	**-0,14039******	**(0,00458)**	**-0,14937** **-0,13141**
nigthshosp	**-0,02557******	**(0,00233)**	**-0,03013** **-0,02100**
dunemployed	**-0,44416******	**(0,04003)**	**-0,52261** **-0,36570**
cons	**9,88555******	**(0,15307)**	**9,58552** **10,18558**
N: 29.120			
F-test : 422.44****			
R-Squared: 0.2022			

p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Women. age>=21 and age<=65. Years 1992-2000 (pooled).

TABLE 7b: EFFECT OF UNEMPLOYMENT ON HEALTH SATISFACTION MISS-REPORTING.

ORDERED PROBIT ESTIMATIONS . WOMEN.

Variables	Ordered Probit			
	Coef.	Std. Errors	95% Conf. Interval	
age	-0,06065****	(0,00426)	-0,06900	-0,05230
age2	0,00042****	(0,00005)	0,00032	0,00051
educat2	0,05736****	(0,01501)	0,02793	0,08678
educat3	0,14192****	(0,01878)	0,10511	0,17872
marstatus1	0,10424****	(0,01922)	0,06656	0,14192
marstatus2	0,11737**	(0,04535)	0,02849	0,20625
marstatus4	0,05560*	(0,02883)	-0,00091	0,11211
marstatus5	0,13177****	(0,03761)	0,05806	0,20547
doctorvisits	-0,07092****	(0,00137)	-0,07361	-0,06822
nigthshosp	-0,01189****	(0,00081)	-0,01347	-0,01030
dunemployed	-0,21987****	(0,01994)	-0,25895	-0,18078
N:29.120				
Log-Likelihood: -57874.175				
Likelihood-Ratio chi2: 6162.63****				
Pseudo R2 (McFaden): 0.0506				

p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Women. age>=21 and age<=65. Years 1992-2000 (pooled).

TABLE 8: VARIABLES DESCRIPTION

Variables	Description
age	Age
age2	Age square
Family Status:	
- marstatus1	married – living together
- marstatus2	married – separated
- marstatus3	single
- marstatus4	divorced
- marstatus5	widowed
Number of doctor visits in the last 3 months:	
- doctorvisits	
Number of nights in the hospital in the present year:	
- nigthshosp	
Unemployed in t+1:	
- dunemployedfut	(0 no unemployed in t+1, 1 unemployed in t+1)

TABLE 9a: EFFECT OF UNEMPLOYMENT IN T+1 ON HEALTH SATISFACTION MISS-REPORTING. OLS ESTIMATIONS. MEN.

Variables	OLS			
	Coef.	Robust Std. Errors	95% Conf. Interval	
age	**-0,11911******	**(0,01007)**	**-0,13886**	**-0,09937**
age2	**0,00096******	**(0,00012)**	**0,00072**	**0,00119**
educat2	-0,05309	(0,03878)	-0,12910	0,02293
educat3	**0,23137******	**(0,04319)**	**0,14672**	**0,31602**
marstatus1	**0,08300****	**(0,03580)**	**0,01284**	**0,15316**
marstatus2	-0,00755	(0,10177)	-0,20703	0,19192
marstatus4	-0,01034	(0,06687)	-0,14141	0,12073
marstatus5	-0,11879	(0,21141)	-0,53316	0,29559
doctorvisits	**-0,13471******	**(0,00730)**	**-0,14901**	**-0,12041**
nigthshosp	**-0,02713******	**(0,00263)**	**-0,03228**	**-0,02197**
dunemployedfut	**-0,41719******	**(0,06542)**	**-0,54542**	**-0,28897**
cons	**10,33150******	**(0,19195)**	**9,95527**	**10,70773**
N: 22.414				
F-test : 193.94****				
R-Squared: 0.1484				

* p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Men. age>=21 and age<=65. Years 1992-2000 (pooled).

TABLE 9b: EFFECT OF UNEMPLOYMENT IN T+1 ON HEALTH SATISFACTION MISS-REPORTING. ORDERED PROBIT ESTIMATIONS. MEN.

Variables	Ordered Probit			
	Coef.	Std. Errors	95% Conf. Interval	
age	-0,07388****	(0,00558)	-0,08481	-0,06295
age2	0,00062****	(0,00007)	0,00049	0,00074
educat2	-0,05196**	(0,02046)	-0,09205	-0,01187
educat3	0,09311****	(0,02359)	0,04687	0,13935
marstatus1	0,03785*	(0,02009)	-0,00153	0,07724
marstatus2	-0,01663	(0,05627)	-0,12692	0,09366
marstatus4	-0,00086	(0,03606)	-0,07155	0,06982
marstatus5	-0,02412	(0,09416)	-0,20867	0,16044
doctorvisits	-0,07034****	(0,00188)	-0,07402	-0,06666
nigthshosp	-0,01392****	(0,00118)	-0,01623	-0,01162
dunemployedfut	-0,21519****	(0,03251)	-0,27891	-0,15147
N: 22.414				
Log-Likelihood: -43451.372				
Likelihood-Ratio chi2: 3365.23****				
Pseudo R2 (McFaden): 0.0373				

* p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Men. age>=21 and age<=65. Years 1992-2000 (pooled).

TABLE 10a: EFFECT OF UNEMPLOYMENT IN T+1 ON HEALTH SATISFACTION MISS-REPORTING. OLS ESTIMATIONS. WOMEN.

Variables	OLS			
	Coef.	Robust Std. Errors	95% Conf. Interval	
age	**-0,10916******	**(0,01145)**	**-0,13161**	**-0,08671**
age2	**0,00086******	**(0,00014)**	**0,00059**	**0,00113**
educat2	0,04227	(0,04121)	-0,03852	0,12305
educat3	**0,18571******	**(0,04664)**	**0,09428**	**0,27713**
marstatus1	**0,14049***	**(0,04355)**	**0,05513**	**0,22584**
marstatus2	**0,34192***	**(0,09937)**	**0,14714**	**0,53669**
marstatus4	**0,11943***	**(0,06678)**	**-0,01146**	**0,25032**
marstatus5	0,08715	(0,09838)	-0,10569	0,28000
doctorvisits	**-0,15668******	**(0,00685)**	**-0,17010**	**-0,14325**
nigthshosp	**-0,02370******	**(0,00347)**	**-0,03051**	**-0,01689**
dunemployedfut	**-0,45095******	**(0,06767)**	**-0,58359**	**-0,31832**
cons	**10,03365******	**(0,21257)**	**9,61700**	**10,45031**
N: 17.309				
F-test : 156.01****				
R-Squared: 0.1625				

* p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Women. age>=21 and age<=65. Years 1992-2000 (pooled).

TABLE 10b: EFFECT OF UNEMPLOYMENT IN T+1 ON HEALTH SATISFACTION MISS-REPORTING. ORDERED PROBIT ESTIMATIONS. WOMEN.

Variables	Ordered Probit			
	Coef.	Std. Errors	95% Conf. Interval	
age	**-0,06691******	**(0,00638)**	**-0,07942**	**-0,05440**
age2	**0,00054******	**(0,00008)**	**0,00039**	**0,00069**
educat2	0,0093	(0,02175)	-0,03333	0,05192
educat3	**0,09052******	**(0,02476)**	**0,04199**	**0,13906**
marstatus1	**0,07516*****	**(0,02399)**	**0,02814**	**0,12218**
marstatus2	**0,19304*****	**(0,05611)**	**0,08306**	**0,30301**
marstatus4	**0,07640****	**(0,03545)**	**0,00691**	**0,14588**
marstatus5	0,06326	(0,05384)	-0,04226	0,16878
doctorvisits	**-0,08041******	**(0,00204)**	**-0,08440**	**-0,07642**
nigthshosp	**-0,01154******	**(0,00114)**	**-0,01378**	**-0,00930**
dunemployedfut	**-0,23346******	**(0,03479)**	**-0,30165**	**-0,16528**
N: 17.309				
Log-Likelihood: -33715.902				
Likelihood-Ratio chi2: 2846.37****				
Pseudo R2 (McFaden): 0.0405				

* p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Women. age>=21 and age<=65. Years 1992-2000 (pooled).

TABLE 11: VARIABLES DESCRIPTION

Variables	Description
age	Age
age2	Age square
Family Status:	
- marstatus1	married – living together
- marstatus2	married – separated
- marstatus3	single
- marstatus4	divorced
- marstatus5	widowed
Number of doctor visits in the last 3 months:	
- doctorvisits	
Number of nights in the hospital in the present year:	
- nigthshosp	
Unemployed in t+1:	
- dunemployedfut1	(0 no unemployed in t+1, 1 unemployed in t+1)
Unemployed in t+2:	
- dunemployedfut2	(0 no unemployed in t+2, 1 unemployed in t+2)

TABLE 12a: EFFECT OF UNEMPLOYMENT IN T+1 AND T+2 ON HEALTH SATISFACTION MISS-REPORTING. OLS ESTIMATIONS. MEN.

Variables	OLS			
	Coef.	Robust Std. Errors	95% Conf. Interval	
age	**-0,12331******	**(0,01173)**	**-0,14630**	**-0,10031**
age2	**0,00101******	**(0,00014)**	**0,00073**	**0,00128**
educat2	-0,02737	(0,04533)	-0,11623	0,06149
educat3	**0,22025******	**(0,05032)**	**0,12161**	**0,31888**
marstatus1	**0,10888*****	**(0,04167)**	**0,02720**	**0,19057**
marstatus2	-0,0627	(0,12120)	-0,30027	0,17487
marstatus4	0,0044	(0,07874)	-0,14994	0,15874
marstatus5	-0,18213	(0,23992)	-0,65241	0,28815
doctorvisits	**-0,13324******	**(0,00791)**	**-0,14873**	**-0,11774**
nigthshosp	**-0,02731******	**(0,00292)**	**-0,03302**	**-0,02159**
dunemployedfut1	**-0,34165******	**(0,08078)**	**-0,49998**	**-0,18331**
dunemployedfut2	**-0,31795******	**(0,07053)**	**-0,45619**	**-0,17971**
cons	**10,39032******	**(0,22306)**	**9,95309**	**10,82754**

N: 17.095
F-test : 141.42****
R-Squared: 0.1510

* p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Men. age>=21 and age<=65. Years 1992-2000 (pooled).

TABLE 12b: EFFECT OF UNEMPLOYMENT IN T+1 ON HEALTH SATISFACTION MISS-REPORTING. ORDERED PROBIT ESTIMATIONS. MEN.

Variables	Ordered Probit			
	Coef.	Std. Errors	95% Conf. Interval	
age	-0,07549****	(0,00655)	-0,08833	-0,06265
age2	0,00064****	(0,00008)	0,00049	0,00079
educat2	-0,03802	(0,02382)	-0,08470	0,00867
educat3	0,08432***	(0,02736)	0,03068	0,13795
marstatus1	0,04818*	(0,02327)	0,00257	0,09379
marstatus2	-0,04943	(0,06560)	-0,17799	0,07914
marstatus4	0,00569	(0,04192)	-0,07648	0,08786
marstatus5	-0,06024	(0,10515)	-0,26632	0,14584
doctorvisits	-0,06982****	(0,00214)	-0,07401	-0,06563
nigthshosp	-0,01417****	(0,00134)	-0,01679	-0,01155
dunemployedfut1	-0,17398****	(0,04004)	-0,25246	-0,09551
dunemployedfut2	-0,17125****	(0,03591)	-0,24162	-0,10088
N: 17.095				
Log-Likelihood: -33171.991				
Likelihood-Ratio chi2: 2617.33****				
Pseudo R2 (McFaden): 0.0380				

* p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Men. age>=21 and age<=65. Years 1992-2000 (pooled).

TABLE 13a: EFFECT OF UNEMPLOYMENT IN T+1 AND T+2 ON HEALTH SATISFACTION MISS-REPORTING. OLS ESTIMATIONS. WOMEN.

Variables	OLS			
	Coef.	Robust Std. Errors	95% Conf. Interval	
age	**-0,12185******	**(0,01343)**	**-0,14818**	**-0,09552**
age2	**0,00101******	**(0,00016)**	**0,00069**	**0,00133**
educat2	0,0473	(0,04734)	-0,04549	0,14010
educat3	**0,18001*****	**(0,05369)**	**0,07477**	**0,28526**
marstatus1	**0,15733*****	**(0,05024)**	**0,05886**	**0,25580**
marstatus2	**0,31509*****	**(0,11265)**	**0,09428**	**0,53590**
marstatus4	**0,16228****	**(0,07687)**	**0,01160**	**0,31296**
marstatus5	0,15347	(0,11271)	-0,06747	0,37440
doctorvisits	**-0,15739******	**(0,00787)**	**-0,17281**	**-0,14197**
nigthshosp	**-0,02350******	**(0,00394)**	**-0,03123**	**-0,01578**
dunemployedfut1	**-0,32608******	**(0,08375)**	**-0,49024**	**-0,16193**
dunemployedfut2	**-0,43429******	**(0,08162)**	**-0,59427**	**-0,27431**
cons	**10,28564******	**(0,24868)**	**9,79819**	**10,77310**
N: 13.213				
F-test : 116.88****				
R-Squared: 0.1684				

* p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Women. age>=21 and age<=65. Years 1992-2000 (pooled).

TABLE 13b: EFFECT OF UNEMPLOYMENT IN T+1 ON HEALTH SATISFACTION MISS-REPORTING. ORDERED PROBIT ESTIMATIONS. WOMEN.

Variables	Ordered Probit			
	Coef.	Std. Errors	95% Conf. Interval	
age	-0,07446****	(0,00746)	-0,08908	-0,05985
age2	0,00064****	(0,00009)	0,00046	0,00081
educat2	0,01137	(0,02503)	-0,03770	0,06043
educat3	0,08660***	(0,02844)	0,03084	0,14235
marstatus1	0,08298***	(0,02762)	0,02886	0,13711
marstatus2	0,17578***	(0,06481)	0,04876	0,30280
marstatus4	0,09771**	(0,04107)	0,01722	0,17820
marstatus5	0,09892	(0,06183)	-0,02226	0,22010
doctorvisits	-0,08112****	(0,00232)	-0,08566	-0,07658
nigthshosp	-0,01139****	(0,00128)	-0,01390	-0,00888
dunemployedfut1	-0,17033****	(0,04379)	-0,25616	-0,08450
dunemployedfut2	-0,22314****	(0,04147)	-0,30441	-0,14187
N: 13.213				
Log-Likelihood: -25719.761				
Likelihood-Ratio chi2: 2263.35****				
Pseudo R2 (McFaden): 0.0421				

* p<.10 ,**p<.05, ***p<.01, ****p<.001   Source: GSOEP
Dependent Variable: Health Satisfaction (0-10)
Sample: Women. age>=21 and age<=65. Years 1992-2000 (pooled).

CHAPTER 3
HEALTH PRODUCTION FUNCTION AND THE DEMAND FOR HEALTH

1. Introduction

In the last chapter, we analysed the relationship between objective and subjective health indicators in order to test the validity of subjective indicators. We concluded that unemployed tend to report lower levels of health satisfaction. However, they reported lower levels of health satisfaction even before the unemployment experience.

Furthermore, we reviewed other studies which objective is also to test the validity of subjective health indicators. These studies use a health production function framework to determine these effects.

In this chapter we review the health production function framework. This framework allow us to analyse the relationship between health inputs and health outputs.

Auster, Grossman, Rosenzweig and Schultz, Kenkel and Cantoyannis and Jones developed models which have influenced most of the posterior empirical studies.

Auster et al. introduced the first global health production function by the end of the 60s. Grossman developed at the beginning of the 70s the Human Capital Model of the Demand for Health.

Rosenzweig and Schult developed a model in the 80s in which they distinguished between exogenous and endogenous inputs.

In the 90s, Kenkel developed a household health production function in which one of the inputs is individual's lifestyle, being lifestyle itself an individual's choice.

Finally, Cantoyannis and Jones following the same idea developed recently a model of lifestyle and health production which they estimated simultaneously.

These models are described in detail in the next section.

Finally, in section 3 we describe the model used for the empirical analysis of the relationship between unemployment and health presented in the next chapter.

2. Health Production Function

There is evidence in the literature of the since decades existing interest in examining which effects have health inputs on health outputs. Specially there has been a big interest in analysing the effect of medical care on health outputs.

Until the 60s most of the studies which analysed the effect of health inputs (specially medical care utilisation) on health outputs included only the inputs that they wanted to

analyse, without considering a global health production function where *all* main health inputs are included.

Then, under the agreement that medical care utilisation could not be the only input which explains health, empirical studies began to consider more global health production functions.

We first review the work of Auster et al. where the effect of medical care and environmental factors are considered together in a health production function.

2.1. First health production functions

Auster et al[170] in their paper construct a health production function in order to answer the following question: *what is the contribution of medical services as opposed to environmental factors and to changes in the health population?*.

In their opinion, past studies which try to determine the contribution of medical services to health use few variables at a time. Therefore, they include in their health production function not only the amount of medical services consumed but also other environmental variables.

$$H = A_1 M^{\sigma_0} \prod_{i=1}^{9} X_i^{\sigma_i} e^{\varepsilon_1} \quad (1)$$

Where,

H represents state mortality,

M is the amount of medical services consumed in that state,

X_i are environmental variables (percent non-white, income, education, standard metropolitan statistical areas, percent employed in manufacturing, alcohol consumption per capita and cigarette consumption per capita, percent in white-collar occupations, females not in the labour force and medical school in state).

σ_o is the elasticity of health with respect to medical services,

σ_i is the elasticity of health with respect to ith environmental factor.

In order to solve the problem of endogeneity between consumption of medical services and health, the authors specify the production function for medical services, and replace it in equation (1).

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[170] Auster R., Leveson I. and Sarachek D. (1969) The production of health: an exploratory study. *Journal of Human Resources* 4: 412-436.

This study is one of the first analysis where such a complete health production function was considered. The authors analyse the impacts of several health inputs (medical services and environmental variables) on mortality in a concrete population.

In the next section we introduce the Human Capital Model of the Demand for Health developed by Grossman in 1972. In his model Grossman analyses how individuals allocate their resources to produce health.

2.2. The Human Capital Model of the Demand for Health

Grossman[171,172] is the author of the so called 'The Human Capital Model of the Demand for Health'. In this model, health is seen as a durable capital stock which output is healthy time. Each individual has an initial amount of this stock which is depreciated with the time and which can be increased by investment.

According to the author, health is demanded by consumers for two reasons:

- health is a consumption commodity[173], which enters directly in the utility function and,

- health is an investment commodity which determines the total amount of time available for market and nonmarket activities.

Thus, the utility function in the basic model can be represented as follows:

$$U = U(\phi_t H_t, Z_t) \qquad t = 0,1,...,n \quad (2)$$

Where,

H_t is the stock of health in time period t,

ϕ_t is the flow of healthy time per unit of H_t,

$h_t = \phi_t \cdot H_t$ is the total healthy time in the period t generated by H_t and,

Z_t is consumption of another commodity.

H_0 is the initial stock of health which is given in the first period. The stock of health at any other period is influenced by the investment decisions of the individual.

Also the length of life is partly determined by the individual, depending on the health investment quantity that maximises his utility taking into account production and resource constraints.

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[171] Grossman M. (1972) On the concept of health capital and the demand for health. *Journal of political economy* 80: 223-255.

[172] Grossman M. (1999) The human capital model of the demand of health. NBER Working Paper 7078.

[173] The author distinguishes between commodities and market goods and services. Commodities are fundamental objects of choice that enter the utility function. Consumers produce commodities with inputs of market goods and services and their own time.

The increase in health depends on the investment decisions and also on the depreciation rate:

$$H_{t+1} - H_t = I_t - \delta_t H_t \quad (3)$$

Where,

I_t is gross investment and,

δ_t is the rate of depreciation during t (which depends on age).

The production of investment in health (and other commodities) is made according the corresponding household production function.

Investment in health is represented by:

$$I_t = I_t(M_t, TH_t; E) \quad (4)$$

Where,

M_t is a vector of market goods,

TH_t is a time input and,

E is the individuals' stock of human capital exclusive of health capital.

The household production function corresponding to other commodities included in the utility function can be represented as:

$$Z_t = Z_t(X_t, T_t; E) \quad (5)$$

Where,

X_t is a vector of market goods,

T_t is a time input and,

E is the individuals' stock of knowledge.

The income sources of the individual are earnings income and the initial assets. The individual spends this income in buying market goods. Therefore, the present value of market goods equates the present value of earnings income over the life cycle plus initial assets:

$$\sum_{t=0}^{n} \frac{P_t M_t + Q_t X_t}{(1+r)^t} = \sum_{t=0}^{n} \frac{W_t TW_t}{(1+r)^t} + A_0 \quad (6)$$

Where,

P_t and Q_t are prices of M_t and X_t (market goods),

W_t is the hourly wage rate,

TW_t, is the total hours of work,

A_0 are the initial assets and,

r is the market rate of interest.

The total amount of time in every period (Ω) is exhausted in working and producing health and other commodities. Furthermore, illness implies a lost of time:

$$\Omega = TW_t + TH_t + T_t + TL_t \quad (7)$$

Where,

TL_t is time lost from market and not market activities due to illness.

By combining the income constraint (6) and the time constraint (7) we obtain the 'full wealth' constraint:

$$\sum_{t=0}^{n} \frac{P_t M_t + Q_t X_t + W_t (TL_t + TH_t + T_t)}{(1+r)^t} = \sum_{t=0}^{n} \frac{W_t \Omega}{(1+r)^t} + A_0 \quad (8)$$

Where,

P_t and Q_t are the prices of M_t and X_t,

W_t is the hourly wage rate,

TW_t is hours of work,

A_0 is initial assets,

r is the market rate of interest,

Ω is the total amount of time available and,

TL_t is time lost from market and nonmarket activities due to illness and injury.

In the right-hand side of the 'full wealth' restriction the components are the initial stock of assets and the discounted value of earnings that the individual would obtain if he spends all his available time at work. This wealth is spent (left-hand side) part on market goods, part in nonmarket production and part is lost due to illness.

By maximising the utility function (2) subject to the investment restriction (3), the household production function (4) and the 'full wealth' constraint (8) we obtain the equilibrium conditions.

Taking into account that an increase in gross investment in t-1 increases the stock of health in all future periods, the optimality conditions for gross investment in t-1 are:

$$\frac{\pi_{t-1}}{(1+r)^{t-1}} = \frac{W_t G_t}{(1+r)^t} + \frac{(1-\delta_t) W_{t+1} G_{t+1}}{(1+r)^{t+1}} + \ldots + \frac{(1-\delta_t) \cdots (1-\delta_{n-1}) W_n G_n}{(1+r)^n} +$$

$$\frac{Uh_t}{\lambda} G_t + \ldots (1-\delta_t) \ldots (1-\delta_{n-1}) \frac{Uh_n}{\lambda} G_n \quad (9)$$

Where,

$Uh_t = \partial U / \partial h_t$,

$G_t = \partial h_t / \partial H_t = -(\partial TL_t / \partial H_t)$ and

π_{t-1} is the marginal cost of gross investment in health in t-1.

and,

$$\pi_{t-1} = \frac{P_{t-1}}{\partial I_{t-1} / \partial M_{t-1}} = \frac{W_{t-1}}{\partial I_{t-1} / \partial TH_{t-1}} \quad (10)$$

The first of the conditions derived from the first order conditions (9) states that the present value of the marginal cost of gross investment in health in period t-1 (left-hand side) must equal the present value of marginal benefits (right-hand side). This condition determines the gross investment in period t-1.

The marginal benefits of investment in health in t are:

$$G_t \left[\frac{W_t}{(1+r)^t} + \frac{Uh_t}{\lambda} \right] \quad (11)$$

Where,

G_t is the marginal product of health capital (increase in the amount of healthy time due to a one-unit increase in the stock of health) .

$W_t /(1+r)^t$ represents the discounted monetary value of one-unit increase of time available and,

Uh_t / λ represents the discounted monetary value of the increase in utility due to an extra unit of healthy time.

The other condition (10) states the condition for minimising the cost of producing a given quantity of gross investment (see eq. (4)). The cost is minimised when the increase in gross investment from spending an additional money unit on medical care equals the increase in total cost from spending an additional money unit on time.

From these two first-order conditions it can be derived the following condition which determines the optimal stock of health in period t:

$$G_t \left[W_t + \left(\frac{Uh_t}{\lambda} \right) (1+r)^t \right] = \pi_{t-1} (r - \tilde{\pi}_{t-1} + \delta_t) \quad (12)$$

This condition implies that the undiscounted value of the marginal product of the optimal stock of health capital at any age must equal the supply price of capital (right-hand side of eq. (12))[174].

This theoretical framework has influenced many empirical studies and also other theoretical works which were developed later. In the following section we introduce Rosenzweig and Schult model which was also based in the Human Capital Model of the Demand for Health.

2.3. Rosenzweig and Schult model

Rosenzweig and Schult[175] in their paper distinguish between two kind of health inputs in health production. The ones which are themselves choices, and the health inputs which are 'exogenous' and can be considered in the health production function as given[176].

The authors argue that since there are health inputs which are decided by the own individual (like smoking, alcohol consumption, practice of sport, eating breakfast...) according to factors which are unobservable for the researcher, health technology must be obtained from a behavioural model in which health inputs are themselves choices.

In their model the household utility function is represented by:

$$U = U(X, Y, H) \quad (13)$$

Where,

H is child health (measured as weight at birth),

X are n consumption goods and,

Y are goods from which the household derives utility and which at the same time enter the health production function of the child (like smoking while pregnancy or number of months that the mother worked while pregnant) .

The production of child health is described by:

$$H = \Gamma(Y, I, \mu) \quad (14)$$

Where,

I are 'exogenous' health inputs and,

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[174] $\pi_{t-1}(r - \tilde{\pi}_{t-1} + \delta_t)$ contains interest, depreciation and capital gains.

[175] Rosenzweig M.R. and Schultz T.P. (1983) Estimating a household production function: heterogeneity, the demand for health inputs and their effects on birth weight. *Journal of Political Economy* vol.91 no.5, pp. (723-746).

[176] This distinction comes from the household production function model introduced by Becker (1965), in which he distinguishes between production technology and preference orderings.

Y are the health inputs 'decided' by the individual,

μ are family-specific health endowments known to the family but not controlled by them.

And the budget constraint is:

$$F = \sum Zp \quad (15)$$

Where,

F is exogenous money income,

p are exogenous prices and

Z=X∪Y∪I.

The reduced form of the demand function for health derived from the maximisation of the utility function subject to the health production function and to the budget constraint can be written as:

$$H = \psi(p, F, \mu) \quad (16)$$

Many studies trying to analyse the relationship of health and health inputs have estimated what the authors call *hybrid* equations which take the form:

$$H = \theta(Y, p, F, \mu) \quad (17)$$

Where,

Y is one input and,

p, F and μ are the determinants of all other inputs.

According to Rosenzweig and Schultz, the estimation of this kind of equations is not desirable. In these models, θ_Y represents both technological properties of the health production function and the characteristics of household's preferences. Concretely, the authors conclude that *the hybrid effect of a health input on health, controlling for prices and income, is generally a biased estimate of the true technical relationship (other inputs held constant) embodied in the health production function.*

Therefore, the authors advise against the use of this kind of equations when analysing health production functions.

Rosenzweig and Schultz estimate the model using two-stage least squares (2SLS) . In the first stage, they estimate the demand equations for the behavioural input variables (*Y*), which at the same time are used to obtain second-stage estimates of the health production parameters.

Most of the theoretical works after Rosenzweig and Schultz (also Kenkel and Contoyannis and Jones) keep the important distinction between exogenous health inputs and health inputs which are themselves choices.

2.4. Kenkel health production function

Kenkel[177] uses in his paper the health production function approach to examine the importance of lifestyles on health. The idea behind is that the individual determines partly his health by choosing his lifestyle.

The individual makes his lifestyle choices taking into account their effect on health and the direct effect on the utility function.

The stock of health is assumed to be produced according to the following household production technology:

$$H = H(L, S, X) \quad (18)$$

Where,

H is the stock of good health,

L represent lifestyle,

S represents the individual's stock of schooling capital and,

X represents exogenous variables.

In this framework, the current health stock depends upon the flow of gross investment, the past stock of health and the rate of depreciation of the health stock. L and S determine gross investment. X can influence the productivity of gross investment and furthermore determine past health and the depreciation rate (age and sex).

Although the author points out in the theoretical framework that lifestyle is itself a choice, in the empirical estimation treats these health inputs as given. The two-stage econometric methods to address this problem were unsuccessful.

Kenkel analyses empirically the effect on health of different health practices like eating breakfast, smoking and doing exercise and also the role played by schooling.

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[177] Kenkel D.S. (1995) Should you eat breakfast? Estimates from health production functions. *Health Economics* vol. 4: 15-29.

2.5. Contoyannis and Jones model

Contoyannis and Jones[178] following the same idea of differentiating between production technology and preference orderings[179] estimate the structural parameters of a health production function together with the reduced parameters for the lifestyle equations.

For the authors, different lifestyles may explain observed health differences. Therefore, they try to identify interactions between health related behaviour and health status, taking as given other factors that are observable.

Contoyannis and Jones present a model of lifestyle and health production which they estimate simultaneously.

The utility function is:

$$\max_{C,H} U(C,H;X_U) \quad (19)$$

Where,

C represents a M-vector of goods,

H represents individual's health and,

X_U represents a vector of exogenous influences on U.

This utility function is maximised subject to budget and time constraints and to the health production function:

$$H = h(C, X_h) \quad (20)$$

Where,

C represents the same vector of goods and,

X_H represents a vector of exogenous influences on health (from now one, X_H and X_U are combined into vector X).

The budget constraint is represented by:

$$\sum_{j=1}^{M} p_j C_j \leq I = m_o + wL \quad (21)$$

Where,

m_0 is exogenous income,

L are hours of labour and w is the wage rate (exogenous).

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[178] Contoyannis P. and Jones A. M. (2001) Socio-economic status, health and lifestile. Discussion Papers in Economics No. 2001/19 Department of Economics and Related Studies. University of York.
[179] Becker G.S. (1965) A theory of the allocation of time. Economic Journal 75. Sept: 493-517.

The time constraint is represented by:

$$\sum_{j=1}^{M} \tau_j C_j = T - L \quad (22)$$

Where,

τ_j is the amount of time necessary to consume a unit of C_j and,

T is the total time available.

By combining the money and time restrictions we obtain the 'full income' constraint:

$$\sum_{j=1}^{M} (p_j + w\tau_j)C_j \leq m_0 + wT \equiv F \quad (23)$$

Where F is full income.

The maximisation problem is the following one:

$$\max_{C,H} L = U(C,H) + \lambda \left((m_0 + wT) - \sum_{j=1}^{M} (p_j + w\tau_j)C_j \right) - \gamma(H - h(C)) \quad (24)$$

Where λ and γ are the marginal utilities of full income and health respectively.

By deriving and solving the first order conditions we will obtain the Marshallian demands for the M goods in our system and for health, the (unobservable) marginal utility of health (γ) at the optimum, and the (unobservable) marginal utility of full income (λ) at the optimum.

$$C_i = f_i(Z) \quad \forall_i = 1,...,M \quad (25)$$

$$H = h(Z) \quad (26)$$

$$\gamma = \gamma(Z) \quad (27)$$

$$\lambda = \lambda(Z) \quad (28)$$

Contoyannis and Jones estimate the parameters of the structural form of the health production function ($H=h(C,X_H)$) together with the reduced form parameters of the equations for lifestyles ($C_i=f_i(Z)$). For the estimation of the multivariate probit model, the authors use Maximum Simulated Likelihood.

Again, the reason for estimating this two equations together is that under their opinion a consistent estimator of the health production must account for the endogeneity between health and lifestyle.

3. Implications for the regression analysis

In the past section, we reviewed the main theoretical models concerning health production.

All these models offer a framework trough which the relationship between health inputs and outputs can be tested.

In the next chapter we test empirically the relationship between unemployment and health. Due to the endogenous relationship between these two variables, we don't analyse how unemployment (and other inputs) in t affect health in t. As we already pointed out, in such an analysis the direction of causality would be not clear.

Therefore, we analyse how health satisfaction changes between two points in time (let's say t-1 and t) when the individual loses his job between these two points in time.

Using information about the sequence in which the events occur, we can isolate the direction of causality in which we are interested.

Due to this methodological feature, our model don't looks exactly like the health production functions that we have analysed in this section. We don't have in the left-hand side of our equation health, but health changes. We analyse how health satisfaction changes between two points in time.

In the right hand side, we have changes in some explanatory variables like changes in household income and job loss (change from employment into unemployment).

Furthermore, in the right hand side of the equation there are other explanatory variables which may determine health satisfaction changes. Health satisfaction at the beginning of the period (let's say t-1) has been introduced since, as we will see in the next chapter, individuals with low levels of health satisfaction have more probabilities to report positive changes of health satisfaction, and individuals who report high levels of health satisfaction at the beginning of the period tend to report less often positive changes of health satisfaction.

Furthermore, other variables like age, being German vs. being foreigner, and living in East-Germany vs. living in West-Germany have been also introduced in the model under the believe that they influence how health satisfaction changes over time.

Finally, it has also been introduced a variable which controls for the effect of long participation in the panel. Individuals tend to respond more extreme values in the first years of a panel and this tendency is corrected with the time.

CHAPTER 4
TESTING THE RELATIONSHIP BETWEEN UNEMPLOYMENT AND HEALTH

1. Introduction

In the first chapter, we reviewed recent studies which analyse the relationship between labour status and health.

Some of these studies, ignored the double direction of causality existing between these two variables. Others, the ones in which panel data was used, try to overcome the problem making use of the longitudinal structure of the data set.

In the present chapter we analyse the relationship between labour status and health satisfaction using the German Socio-Economic Panel.

First, we analyse descriptively the relationship between these two variables and next, we analyse this relationship in a multivariate analysis.

The longitudinal structure of the GSOEP allow us to observe health satisfaction before and after the individual loses his job. Therefore, in the multivariate analysis we analyse how job loss occurred between two points in time affects change in health satisfaction between these two points in time.

Furthermore, due to the length of the data set (18 waves) we are able to distinguish between short (less than one year) and long term unemployment.

2. Data Set and Sample Selection

2.1. Data Set: GSOEP

The data used in the empirical analysis is from the German Socio-economic Panel (GSOEP). The GSOEP is a representative longitudinal survey of the German population. The panel was started in 1984 and since then has been repeated yearly[180].

In the first wave, information of 5.921 West-German households was collected. All persons in a household aged 16 and over were interviewed deriving in a total of 12.245 respondents. This main sample included 4.500 not-foreign households and 1.400 households where the head of the household had Turkish, Greek, Yugoslavian, Spanish or Italian nationality.

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[180] Wagner G., Burkhauser R.V. and Behringer F. (1993) The English language public use file of the German Socio-Economic Panel. *The Journal of Human Resources* vol. 28(2):429-433.
Schupp J. and Wagner G. (1995) The German Socio-Economic Panel: a database for longitudinal international comparisons. *Innovation* vol.8 (1): 95-108.
Schupp J. and Wagner G. (2002) Maintenance of and innovation in long-term panel studies: the case of the German Socio-Economic Panel (GSOEP). *Allgemeines Statistisches Archiv* 86:163-175.

The first wave of the east-German sub-sample was introduced in 1990 and included about 2.200 households. In this first wave, 4.453 individuals aged 16 years old and older answered the questionnaires.

In 1994/95 a new sample of 522 households (1.078 surveyed individuals) was included. These sample is integrated by immigrants who arrived to Germany after 1983. The reason for this new sample is the large-scale immigration which experienced Germany since the beginning of the panel and which was not possible to be covered by the ongoing longitudinal survey.

A supplementary random sample was started in 1998 in order to fulfil different goals:

- stabilisation of the number of cases in the GSOEP for cross-sectional and longitudinal data,
- allowing for analysis of 'panel effects' and,
- allowing for analysis of representativeness.

1.932 individuals living in 1.067 households were surveyed. With this new sample, it was established the methodological basis for a further supplementary sample introduced in 2000 which includes 10.890 adult respondents living in 6.058 households.

As a result, in the year 2000 about 25.000 adult individuals living in about 13.000 households where interviewed.

Individuals respond the questions included in the GSOEP questionnaires. There are three different types of questionnaires:

- Household questionnaires which are complete by the reference person ('head of the household'). They provide information about the household as a whole.
- Individual questionnaire completed by each person 16 or older.
- Biography questionnaires which are completed by all the respondents once in the first year when the person is interviewed.

With these questionnaires, information of different natures is collected. A part from the standard demographic information, GSOEP also contains objective measures (like use of time, use of earnings, income, benefit payments...) and subjective measures (like level of satisfaction with various aspects of life, political involvement...).

As we already pointed out, individuals are interviewed yearly, so that we can follow the evolution of the information for the same individual. With this longitudinal structure it is possible to analyse changes in the health variables over time, and whether this changes are related to changes in other socio-demographic factors. However, no health data are

collected between the interviews, so that in most cases we don't have a measure of health immediatelly before and after job loss.

2.2. Sample Selection

For the empirical analysis presented in the following sections, we have selected individuals with ages between 21 and 65 years old. We consider that between these ages is when most individuals are active in the labour market.

Furthermore, we have selected individuals who belong to households with a specific structure. Concretely, we select households composed by couples[181] with or without children, excluding single parent households, one person households and households composed by multiple generations. The reason for this selection is that in the analysis of the relationship between unemployment and health satisfaction, we want to see whether or not the effect of unemployment is moderated or stressed by the labour status of the partner.

As we describe in following sections, the objective is to analyse whether concrete transitions in the labour market have an effect on changes in health satisfaction in the considered period. For this reason, we select individuals belonging to households which didn't suffer relevant family changes in the considered period[182]. In this way we avoid capturing the effect of relevant family changes in health satisfaction changes.

We include observations of the first 18 waves of the GSOEP, from 1984 until the year 2001. After the selections specified above our sample contains 126.650 observations. Although this is our basic sample, further selections have been carried out in the models that have been estimated. However, these selections are specific for the different models and therefore are specified in the corresponding sections.

These 127.000 observations correspond to 24.602 individuals who participate in the panel. The individuals enter and exit the panel at different points, as a result we have an unbalanced panel. At about the 40% of the individuals of the sample were present in our panel at least 5 waves.

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[181] Married or not married.
[182] In GSOEP the relevant family changes considered are: wedding/marriage, moving in with partner or spouse, divorce, separation from partner or spouse, death of partner or spouse, birth of a child, child moves out and other family changes.

3. Health Satisfaction Distribution

Subjective indicators of health are global indicators which include psychological and social aspects (see chapter 2), therefore they are nearer than objective health indicators to the WHO definition of health: complete state of physical, mental and social well-being.

In GSOEP there are two health subjective indicators: self-rated health status and health satisfaction. In the first case, the individual is asked to rate his health status[183] in a scale from 1 to 5 (being 1 very good and 5 bad).

This variable was first introduced in GSOEP in 1992 whereas health satisfaction was already introduced in the first wave (1984). Since health satisfaction has been present in the 18 waves, we have a broad information about the evolution of health satisfaction reports of the individuals who participate in the panel.

Therefore, we use health satisfaction as dependent variable in our empirical analysis. Other advantages of the use of this variable were explained in chapter 2, were the advantages of working with subjective health indicators were analysed.

Another interesting characteristic of this variable is the small number of missing values. In our sample of 126.650 observations, we observe only 287 missing values for this variable.

In the questionnaire, individuals answer to the question: 'How satisfied are you with your health?' and they rate their answer in a scale from 0 to 10, being 0 completely unsatisfied and 10 the highest level of satisfaction . In tables 1 and 2 the frequencies of this variable are analysed.

The responses are not centred at the value 5 of the scale. The weighted mean for this variable is 6,7 indicating that individuals tend to report higher levels of health satisfaction. In Table 1 we can observe that only 15% of the reports are under the value 5. The higher concentration is at the values 7 and 8.

In Table 2, the 11 response categories have been grouped into 3 categories. Low responses (0,1), medium responses (from 2 to 6) and high responses (from 7 to 10). We observe that most of the responses are concentrated in the third category. Concretely, 60% of our sample respond to the question 'how satisfied are you with your health' with values higher than 6.

In this table we also analyse health satisfaction frequencies for different sub-samples. If we compare men and women, we observe that while there is a similar percentage of low

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[183] How would you describe your health at present?

responses (2,17% for men and 2,19% for women), men respond more often than women values higher than 6 (62% for men and 58,8% for women).

east- and west-Germans present similar percentages. And finally, Germans[184] report more often than foreigners[185] higher levels of health satisfaction.

In Figures 1 to 4 we analyse graphically the distribution of the health satisfaction variable. In the first figure, we analyse the distribution for 3 different years (1985, 1992 and 2001) for the men sub-sample. The pictures of these three distributions representing the beginning, the mid-point, and the end of the panel are similar. There are two picks in the distributions, one in the value 5 and the other in the value 8. Being the pick in the value 8 higher than the pick in 5.

There is a remarkable difference in the percentage of individuals reporting the highest value (10) between the distribution in 1985 and the distribution in 1992 and 2001. One plausible explanation for this feature is that individuals tend to respond more extreme values in the first years of a panel, and this tendency is corrected with the time[186]. Another explanation for the reduction in the percentage of individuals reporting extreme values of health satisfaction between the years 1985 and 1992, is that in 1992 east-Germans were included in the sample and east-Germans tend to report less often the value 10, producing a reduction of the percentage of the reported extreme values in the overall sample.

A part from this feature, we can conclude that the distribution of the health satisfaction variable has not suffered big changes since the beginning of the panel.

In figure 2 we analyse the distribution of the health satisfaction variable in the years 1985, 1992 and 2001 for the women sub-sample.

Although we observe again two picks (in 5 and in 8) in the three distributions, there are bigger differences between these three distributions than between the three analysed distributions of the men sub-sample. This means that while for men the health satisfaction distribution didn't suffer big changes since the beginning of the panel, in the women sub-sample the health satisfaction variable has suffered certain evolution since 1984.

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[184] Born in Germany or immigrated to Germany before 1949.
[185] Immigration year >1949.
[186] Schräpler J-P. (1997) Eine empirische Erklärung von formalen Antwortstilen - Stereotypes Antwortverhalten und Zustimmungstendenzen im Sozio-ökonomischen Panel (SOEP). *Kölner Zeitschrift für Soziologie und Sozialpsychologie* vol. 49(4): 728-746.
Schräpler J-P. (2001) Respondent behavior in panel studies: a case study of the German Socio-Economic Panel (GSOEP). DIW Discussion Paper No. 244.

Concretely, in 1985 the pick in 5 was higher than the pick in 8, while for the other two distributions the pick in 8 was higher (like in the men sub-sample). And again, we observe a reduction in the percentage of the reported extreme values between 1985 and 1992.

In figure 3 we analyse the health satisfaction distribution distinguishing between east- and west-Germans for the men sub-sample. Concretely, we compare the distributions in 1992 and 2001 for east- and west-Germans.

We observe similar distributions, however, the pick in 5 is higher for east-Germans than for west-Germans. In other words, east-Germans report more often the value 5 than west-Germans.

In figure 4 we carry out the same analysis for the women sub-sample. In this case we arrive to similar conclusions, although the distributions are similar, east-German women report more often than west-German women the value 5 of the scale.

4. Labour Force Status Distribution

In the last section we described the dependent variable of the empirical analysis. In the present section, we describe the main explanatory variable of the analysis: labour status.

Labour status has been categorised in three groups: Non-Working (out of the labour force), Unemployed (registered) and Working (gainfully employed/self-employed).

The labour status variable has suffered some changes since the beginning of the GSOEP. The categories Non-working, Unemployed and Working have been maintained but other new categories have been included.

In 1984 a part from the three main categories the following ones were also included: non-working: age 65 and older, non-working: in education-training, non-working: military-civil service, which have been included in the present study in the non-working category.

Later new categories were introduced like non-working: maternity leave, non-working: but sometimes secondary job, non-working: but regular secondary job, which have been also included in the non-working category.

Finally, in the last waves (in 1999 and 2000) information was introduced about the last week before the interview: non-working: but working in the past 7 days, working: but non working in the past seven days. These last categories have been also included in the non-working category, since there is not a regular activity in the labour market.

In table 3, we present the frequencies of the three categories in which labour status is classified.

For the general sample, we observe that most individuals (67,15%) are working, a reasonable percentage taking into account the age of the individuals included in our sample (between 21 and 65). The percentage of individuals out of the labour force is 27,48% and the unemployment rate is 5,37%.

If we compare men and women we observe big differences in the employment rates. While 78,49% of the men are working, only the 55,65% of the women are working. This difference is translated in a difference of the same magnitude (but different sign) in the category out of the labour force.

While almost 40% of the women of our sample are out of the labour force, only the 15,80% of the men are in this situation. The unemployment rates for men and women are similar.

By comparing east- and west-Germans we also observe some differences. While the percentages of employed individuals are similar, we observe important differences in the rate of unemployment and in the percentage of individuals out of the labour force. The unemployment rate for west-Germans is 4% while the one for east-Germans is 13,18%. On the other hand the percentage of individuals out of the labour force is higher for west-Germans (28,72%) than for east-Germans (20%).

Low rates of individuals out of the labour force was one of the main characteristics of the labour market in the former DDR. We observe that still after 1990 the percentage of individuals out of the labour force in East-Germany is lower than in West-Germany.

By comparing Germans and foreigners, we observe a difference of more than 4 points in the unemployment rate. While for Germans the unemployment rate is 4,8% for foreigners is 9,06%. This is translated in a difference in the employment rate of the same magnitude. While the employment rate for the foreigners is 63,47% for Germans is 67,66%.

In the sample considered for our analysis there are no missing values in the labour force status variable.

5. Labour Force Status and Health Satisfaction

5.1. Introduction

In the last two sections we described the variables health satisfaction (our dependent variable) and labour status (our main explanatory variable). In the present section we analyse the relationship between these two variables.

We first present a descriptive analysis of the relationship between health satisfaction and labour status. Next, we analyse the relationship between changes in labour status and

changes in health satisfaction. And finally, we analyse the relationship between changes in health satisfaction (between before and after job loss) and different lengths of unemployment spells.

With this descriptive analysis we want to see whether or not individuals who lose their job report more often negative changes of health satisfaction, and whether or not different lengths of unemployment may have different effects on health satisfaction.

This descriptive analysis is the basis for our multivariate analysis of the effect of different transitions in the labour market on change in health satisfaction which is presented in following sections.

5.2. Descriptive Analysis

In table 4 we observe health satisfaction levels for the different labour status categories considered.

For the general sample, the percentage of health satisfaction reports higher than 6 is higher for the employed individuals than for individuals who are out of the labour market. At the same time, individuals out of the labour force report more often higher levels of health satisfaction than unemployed.

The percentage of low reports of health satisfaction (0,1) is smaller for the employed individuals than for individuals who are unemployed and out of the labour market.

We can conclude that employed individuals are more satisfied with their health than unemployed and individuals out of the labour force. And by comparing unemployed with individuals out of the labour force, we observe that the last ones are better off in terms of health satisfaction.

If we split the sample into men and women sub-sample we arrive to the same conclusion. For both, men and women, the employed individuals are the ones who are most satisfied with their health .

However, in the men sub-sample, individuals out of the labour force are not better off than the unemployed individuals while for women, being out of the labour force is better than being unemployed in terms of health satisfaction.

By comparing both sub-samples we observe that women who are out of the labour force are better off than men who are out of the labour force. One interpretation for this result is that while women still can feel good out of the labour market (and may be in the role as mother and housewife), men don't find easily their place out of the labour market, due to the fact that traditionally a man's life was (is) strongly linked to the labour market.

By analysing separately east- and west-Germans we conclude that for both sub-samples, individuals are more satisfied with their health when they are employed than when they are unemployed or out of the labour force.

However, for east-Germans we observe for all categories (non-working, unemployed and working) lower percentages of individuals reporting high values of satisfaction. Their responses are more concentrated in middle values with respect to west-Germans.

The main difference between these two sub-samples is in the category out of the labour force. West-Germans who are out of the labour force are better off than east-Germans who are out of the labour force. One possible explanation for this result is that individuals who had to leave involuntarily the labour market after 1989 due to the economic reestructuration in East-Germany were affected by this dramatic situation.

Finally, we compare the foreigners sub-sample with the Germans sub-sample. Employed have higher health satisfaction that unemployed and individuals who are out of the labour market in both sub-samples.

In this case, we find big differences between the two sub-samples in the health satisfaction reports of the unemployed. Unemployed who are not German are less satisfied with their health that unemployed who were born in Germany.

Summarising, after the analysis of table 4 we conclude that employed are better off in terms of health satisfaction than individuals who are not employed. However, we can not conclude from these results that employment *causes* higher levels of health satisfaction. First, because we have not controlled for other factors, and second because employed may be more satisfied with their health due to a selection process. In other words, we may observe higher levels of satisfaction for employed individuals because individuals with higher levels of satisfaction may have more possibilities to be employed.

In table 5 we analyse the relationship between health satisfaction in t-1 and labour status in t only for individuals who were working in t-1 (in order to homogenise the sample).

We observe that the percentage of individuals who work in t is much lower if they reported low levels of health satisfaction in t-1 than if they reported higher levels of health satisfaction. We observe this feature for all sub-samples considered.

We also observe that individuals reporting 0 and 1 health satisfaction are more often out of the labour force in t than individuals reporting higher levels of health satisfaction. This is due to the fact that usually individuals reporting these low levels of health satisfaction have to leave the labour market due to serious health reasons.

We observe in table 6 that individuals with extreme low values of health satisfaction die more often in the following 5 years that individuals who reported higher levels of health satisfaction.

Summarising, health satisfaction may have an influence in labour status. Therefore, and returning to the conclusion that we obtained from table 4, by observing that employed individuals are more satisfied with their health than not employed individuals, we can not conclude that is employment what make individuals feel better since there may exist a double direction of causality.

Therefore, we change the object of study, or in other words, we change our dependent variable. From now on, we analyse changes in health satisfaction in stead of health satisfaction levels[187].

We analyse in the following tables the effect of different transitions in the labour market on changes in health satisfaction.

Due to the availability of longitudinal data we can identify the sequence in which the labour market events occur. We can compare health satisfaction of the individuals before and after they have lost their job. In this way, we can observe how health satisfaction is affected by a labour market event.

In table 7 we analyse the relationship between different transitions in the labour market and changes in health satisfaction between t-1 and t.

In this descriptive analysis, there is a certain bias since individuals with extreme responses (0 and 10) are included and they can only experience changes in one direction.

In our sample, individuals reporting 0 satisfaction with health represent the 1,24% of all observations. From all the individuals who answered 0, the 31% reported no changes in the following year, and the rest reported positive changes. Individuals reporting health satisfaction equal 10 represent the 9,23% of the sample. From these individuals, the 41,5% reported no change in the following year, and the rest reported negative changes.

Returning to the results obtained in table 7, if we consider all the sample we don't observe big differences in terms of health satisfaction changes between the considered transitions.

If we compare individuals who found a job in this period with individuals who were working and remained employed, we observe that the percentage of people reporting positive changes of health satisfaction is higher for the reemployed individuals. However,

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[187]Clark A.E. (2002) A note on unhappiness and unemployment duration. WP February 2002. DELTA (France).

this group has also a higher percentage of individuals reporting negative health satisfaction.

Surprisingly, individuals who lost their job in this period report more often a positive change in health satisfaction than individuals who were employed and remain employed.

Summarising, by observing changes in health satisfaction between t-1 and t for individuals who suffered the considered transitions in the labour market, we can not conclude that there is evidence of a negative effect of job loss on health satisfaction.

After splitting the sample into men sub-sample and women sub-sample we obtain similar results. Reemployed individuals report more often positive changes in health satisfaction than individuals who were working and who remain employed.

And also for both sub-samples the percentage of individuals reporting negative changes in health satisfaction is higher for the reemployed individuals than for the employed (in t-1 and t) ones.

Men who lost their job between t-1 and t report more often positive changes and less often negative changes in health satisfaction than those individuals who are employed in t-1 and t.

Women who lost their job also report more often positive changes in health satisfaction than women who remain in employment. However, the percentage of women reporting negative changes of health satisfaction is higher for women who lost their job than for women who were working in t-1 and remain employed in t.

By splitting the sample into west-Germans and east-Germans, we obtain similar results, and the same happens if we split the sample into Germans and foreigners.

As we already concluded for the general sample, after analysing changes in health satisfaction for different sub-samples, we can conclude that there is no evidence of a negative effect of job loss on health satisfaction.

However, till now we have not analysed how health satisfaction responses change if the length of unemployment increases. We have only considered which is the effect on health satisfaction of losing between t-1 and t. Therefore individuals are not longer than one year unemployed. But, which is the effect on health satisfaction if the individual is more than one year unemployed? and more than two years?

In table 8 we first analyse the relationship between health satisfaction and length of the unemployment spell. We compare health satisfaction of individuals who are unemployed (distinguishing between different lengths of the unemployment spell) with individuals who are working.

By considering all the sample, we observe that individuals who are working are more satisfied with their health[188] that individuals who are unemployed independently from the length of the unemployment spell.

Furthermore, health satisfaction decreases as the length of the unemployment spell increases. Unemployed who are less than 12 months unemployed are more satisfied with their health than individuals who are more than one year unemployment. At the same time, individuals who are more than two years unemployed are less satisfied with their health than individuals who are between one and two years unemployed.

We arrive to the same conclusion if we split the sample into different sub-samples: Men/women, east-/west-Germans, and Germans/Foreigners. For all these sub-samples, the level of satisfaction of employed individuals is higher than the one of the unemployed. At the same time, the level of satisfaction decreases as the length of the unemployment spell increases.

The only exception is that foreigners who are between one are two years unemployed are more satisfied with their health than individuals who are less than 12 months unemployed. However, after two years of unemployment the level of satisfaction decreases dramatically.

In table 8 we have analysed the level of satisfaction for different lengths of unemployment spell, concluding that employed are more satisfied than unemployed and that long-term unemployed are less satisfied than short-term unemployed.

However, in this analysis we have not solved the problem of reverse causality. We don't know if long term unemployment causes a reduction in health satisfaction or if individuals with low health satisfaction have more probabilities to be long-term unemployed.

Therefore, in table 9 we analyse health satisfaction changes between before and during the unemployment experience, considering different lengths of the unemployment spell.

In t, some individuals have been less than one year unemployed, others between one and two years and others between two and three years. We compare health satisfaction in t with health satisfaction before they lost the job. The reference group in this table are individuals who were working in t-1 and remain employed in t[189].

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[188] The percentage of individuals reporting higher levels of health satisfaction is higher. At the same time, the percentage of individuals reporting lower levels of health satisfaction is lower.

[189] In this table we compare changes in health satisfaction between t-1 and t (for individuals who remain employed and for individuals who are less than one year unemployed) with changes in health satisfaction between t-2 and t (for individuals who are more than one year unemployed and less than 2 years) and with

If we consider all the sample, we observe that individuals who are less than one year unemployed have a higher percentage of positive changes and similar percentage of negative changes in health satisfaction than individuals who were working in t-1 and remain employed.

However, there is a reduction in the percentage of positive changes in health satisfaction and an increase of the percentage of negative changes in health satisfaction if the individual is more than one year (and less than 2) unemployed.

Finally, if the individual is more than two years unemployed (and less than three) the percentage of positive changes increases again, and the percentage of negative changes decreases.

From this descriptive analysis we conclude that if individuals lose their job there is even a positive effect on health satisfaction which is reduced when individuals are more than one year unemployed. If they are more than two years unemployed there is a certain adaptation to their situation since the percentage of positive changes increases and the percentage of negative changes decreases.

If we split the sample into men and women sub-sample we obtain similar results. Men and women who are less than one year unemployed report more often positive changes in health satisfaction than the individuals who are employed (and who were last year employed). Men also report less often a negative change in health satisfaction. However, women have a higher percentage of negative changes in health satisfaction (than women who are employed) if they have lost their job in the last year.

An interesting result is that while men show certain evidence of adaptation, women don't. As in the general sample, after 2 years of unemployment, men report a higher percentage of positive changes in health satisfaction than men who are between one and two years unemployed[190]. However, for women this percentage does not change between women who are more than one but less than two years unemployed and women who are more than 2 years (and less than three) unemployed (although the percentage of women reporting negative changes decreases).

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changes in health satisfaction between t-3 and t (for individuals who are more than 2 years unemployed). These 3 different variables may not be perfectly comparable, however this comparison is useful for our descriptive purposes.

In the multivariate analysis it will be considered the same period for all individuals included in the analysis.

[190] However, the percentage of negative changes in health satisfaction remains unchanged. As a result there is a reduction in the percentage of men reporting no changes in health satisfaction.

The first interpretation of these descriptive results is that there is a certain adaptation process of men who remain unemployed more than two years while there is no evidence of this process for women.

By analysing separately east- and west-Germans we arrive to similar results. While for west-Germans there is evidence of adaptation to unemployment (the percentage of positive changes increases and the percentage of negative changes decreases as the period of unemployment increases), east-Germans don't show adaptation. Their percentage of positive changes in health satisfaction is drastically reduced and the percentage of negative changes increases if individuals are more than two years unemployed.

Finally, by splitting the sample into Germans and no-Germans, we observe that Germans follow the same pattern as the general sample. There is evidence of adaptation to unemployment after two years of unemployment.

In the foreigners sub-sample, we observe also evidence of adaptation. However, this adaptation occurs already after the first year of unemployment. The percentage of positive changes for individuals who are more than one year unemployed is higher than for individuals who are less than one year unemployed, while the percentage of negative changes remains constant.

Summarising, we observe in the general sample and in the considered sub-samples no evidence of a negative effect of short-time unemployment in health satisfaction[191]. However, after the first year of unemployment there is an increase in the percentage of negative health satisfaction changes.

After the second year of unemployment, there is evidence of adaptation to unemployment for the general sample, and by analysing different sub-samples separately, we obtain different results. While for men and west-Germans there is evidence of adaptation, for women and east-Germans we don't observe evidence of adaptation after two years of unemployment. Germans and foreigners also present evidence of adaptation, however, while foreigners get used to their situation after one year of unemployment, Germans do it after the second year of unemployment.

In table 10, we split further the first year of unemployment. We distinguish between individuals who are less than three months unemployed, and individuals who are more than three months unemployed (and less than one year) and we compare health satisfaction changes of these individuals with health satisfaction changes of individuals who were employed in t-1 and remain employed in t.

The reason for this comparison is that we want to analyse whether or not there is a positive effect of losing the job (similar to a holiday effect) in the first (three) months of unemployment, which is reduced in the following months.

If we analyse the general sample, we observe that individuals who are less than three months unemployment, report more often positive changes and less often negative changes in health satisfaction than individuals who were employed and remain employed. If the period of unemployment is longer than three months individuals report less often positive changes and more often negative changes in health satisfaction than individuals who are less than three months unemployed.

By splitting the sample into men and women sub-sample we observe that for men, after the third month of unemployment, the percentage of positive changes decreases and the percentage of negative changes in health satisfaction increases as in the general sample. However, for women the percentage of positive changes remains constant after the third month of unemployment and the percentage of negative changes even decreases.

The results by splitting the sample into west- and east-Germans are similar to the ones obtained with the general sample. The first three months of unemployment seem to be a positive experience in terms of health satisfaction for both sub-samples, however the percentage of negative changes in health satisfaction increases after the third month of unemployment.

In the German sub-sample we obtain similar results, however, in the Foreigners sub-sample the results differ from the ones observed in the general sample. While individuals who are less than three months unemployed report less often positive changes and more often negative changes in health satisfaction than employed individuals, after the third month of unemployment there is an increase in the percentage of positive changes and a reduction in the percentage of negative changes (just the contrary that what we observed in the general sample and in the other considered sub-samples).

Summarising, there is certain difference in the effect of unemployment on health satisfaction between individuals who are less than three months unemployed and individuals who are more than three months (and less than one year) unemployed. This result is compatible with the predictions made by the stages model[192] reviewed in the first

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[191] There is even evidence of a positive effect.
[192] Eisenberg and Lazarsfeld in Ezzy D. (1993) Unemployment and mental health: a critical review. *Soc. Sci. Med*. Vol. 37(1), 41-52.

chapter. This model explains that after loosing the job, the individual goes through different phases which go from optimism to pessimism and finally even to fatalism.

In the multivariate analysis we distinguish between individuals who are less than one year unemployed with individuals who are more than one year unemployed. We consider under one year short-term unemployment and more than one year long-term unemployment.

6. Preliminary Conclusions and Implications for the Multivariate Analysis

In the last section, we analysed descriptively the relationship between health satisfaction and labour status.

We first observed that employed individuals are more satisfied with their health than non employed (out of the labour force/ unemployed) individuals. At the same time, individuals out of the labour force are more satisfied with their health than unemployed individuals.

The first conclusion of this descriptive analysis is that the best labour status in terms of health satisfaction is employment.

However, we don't know whether employed are better off due to the positive effect of employment or whether individuals who are more satisfied with their health have more probabilities to find a job.

In order to illustrate this double direction of the relationship between health satisfaction and labour status we analysed in table 5 the relationship between health satisfaction in t-1 and labour force status in t[193]. We observed that individuals who reported high levels of satisfaction in t-1 remained more often employed than individuals who reported lower levels of health satisfaction.

In order to overcome the problem of the double direction of the relationship between the two variables we made use of the longitudinal structure of the GSOEP. Since we are able to observe the individual at different points of time, we can identify the sequence in which the events take place. This allow us to compare health satisfaction before and after a labour market event occurs.

In table 7 we analysed the relationship between changes in health satisfaction and different labour market transitions occurred between t-1 and t. We did not find evidence of a negative effect on health satisfaction of losing the job.

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[193] Only for individuals who were employed in t-1.

In this table (table 7) we considered individuals who were less than one year unemployed[194], but we didn't analyse whether or not the effect on health satisfaction changes if the individual remains for more than one year unemployed.

Therefore, in table 8 we analysed the relationship between health satisfaction and unemployment, considering individuals who were less than one year unemployed, between one and two years, and more than two years (and less than three). Again, we observed that unemployed were less satisfied with their health than individuals who were working. And by comparing unemployed with different lengths of unemployment spell, we observed that health satisfaction diminishes as the period of unemployment increases.

However, in table 8 we did not solve the problem of reverse causality. We analysed health satisfaction levels for different lengths of unemployment. Therefore in table 9, we analysed changes in health satisfaction (between before and after job loss) for different lengths of unemployment spell, taking as a reference group individuals who were working in t-1 and remained employed in t.

In this table we did not find either evidence of a negative effect of short time unemployment[195]. However, after the first year of unemployment there was an increase of the percentage of negative changes in health satisfaction. After the second year of unemployment there was an improvement in health satisfaction, showing evidence of adaptation to unemployment.

Finally, in table 10 we split further the first year of unemployment, distinguishing between individuals who were less than three months unemployed and individuals who were more than 3 months (and less than 12) unemployed. We observed some differences in health satisfaction changes between individuals who were less than three months unemployed and individuals who were more than three months (but still less than one year) unemployed.

Summarising, from the descriptive analysis of the relationship between labour status and health satisfaction, we can conclude that the effect of unemployment on health satisfaction changes as the period of unemployment increases.

Therefore, in our multivariate analysis we analyse the effect of short and long term unemployment.

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[194] Individuals who were working in t-1 and lost their job between t-1 and t.
[195] Less than one year.

In order to identify the effect of short time unemployment on health satisfaction, we first use a model in which only the period between t-1 and t is considered and we analyse how health satisfaction of individuals who lose their job between t-1 and t changes.

Next, we consider a longer period (from t-3 to t) and we compare the different effects of losing the job between t-3 and t-2, between t-2 and t-1, and between t-1 and t, taking as reference group individuals who remain employed[196].

Finally, we analyse which are the effects of reemployment. We consider all individuals who were unemployed in t-1 and we compare health satisfaction changes of individuals who remained unemployed til t with health satisfaction changes of those individuals who found a job in the period between t-1 and t.

7. Multivariate Analysis

7.1. Introduction

The objective of the multivariate analysis described in this section is to analyse the effects of short and long term unemployment and reemployment on health satisfaction.

Due to the longitudinal structure of the GSOEP we are able to observe health satisfaction responses of the individuals before and after job loss or before and after reemployment. Therefore, our dependent variable is change in health satisfaction, and job loss and reemployment are the main explanatory variables which effect we want to analyse.

As we already introduced in the last section, we consider two models in order to identify the effects of short and long term unemployment and a third one in order to identify the effects of reemployment.

In order to select individuals who are comparable (see Gallo et al.[197]), we select for the first two models only individuals who are working at the beginning of the considered period. And then, we compare, individuals who lose their job with individuals who remain employed.

Therefore, a part from the sample selection that we already described in the corresponding section, we select individuals who are employed at the beginning of the period.

For the third model, we select individuals who are unemployed at the beginning of the period, and we compare individuals who remain unemployed with individuals who find a job in the considered period.

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[196] In both models, in the first period (t-1 and t-3 respectively) all individuals are employed.

7.2. Description of the models

7.2.a. Model A

In the first model (model A) we consider the period between t-1 and t. In t-1 all individuals are employed. And from these individuals, some remain employed and others lose their job and remain unemployed till t[198]. The dependent variable is change in health satisfaction between t-1 and t.

We analyse whether or not job loss between t-1 and t has an effect on health satisfaction changes taking as a reference category remaining in employment.

Next we illustrate graphically the model:

FIGURE 5. MODEL A. EFFECT OF SHORT-TERM UNEMPLOYMENT ON HEALTH SATISFACTION.
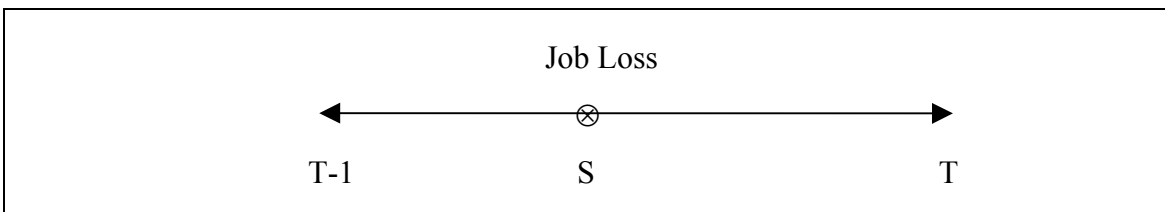
(*)T>S>T-1
(**) In T-1 all individuals are employed

In S (a point of time between t-1 and t) some of the individuals considered in the sample suffer a job loss[199]. This may have an effect on health satisfaction. We compare how health satisfaction of these individuals has changed between t-1 and t in relation to individuals who remain employed the whole period.

In this model we only consider periods of unemployment shorter than one year since we only consider the period between t-1 and t. In the following model we consider a longer period in order to identify the effects of short and long term unemployment.

7.2.b Model B

In this model, we consider the period between t-3 and t. Again, all individuals are in t-3 employed. Some of them remain all the period employed, some of them lose their job between t-3 and t-2, others between t-2 and t-1, and others between t-1 and t[200].

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[197] Gallo W.T., Bradley E.H. & Kasl S.V. (2000) The effect of job displacement on subsequent health. Paper presented in the GSOEP Users Conference 2000. Berlin.

[198] We don't consider in this model other kind of transitions. Other transitions like going out of the labour market are considered as missing values.
If an individual loses his job between t-1 and t but finds again a job before t it is also considered as missing value.

[199] S is not constant across individuals. For some of them S will be nearer to t-1 and for others nearer to t.

[200] We don't consider in this model other kind of transitions. Other transitions like going out of the labour market are considered as missing values.

The dependent variable is change in health satisfaction between t-3 and t.

The objective of this model is to analyse whether or not there is a different effect on health satisfaction if the individual loses his job at the beginning of the period or at the end of the period. If the individual loses the job at the beginning of the period (between t-3 and t-2) and remains unemployed, in t is more than 2 years unemployed. However, if the individual loses his job at the end of the period (between t-1 and t) in t is for less than one year unemployed.

As we observed in the descriptive analysis, different lengths in the unemployment spell may lead to different effects on health satisfaction, and this is what we want to test with this model.

FIGURE 6. MODEL B. EFFECT OF SHORT AND LONG -TERM UNEMPLOYMENT ON HEALTH SATISFACTION.
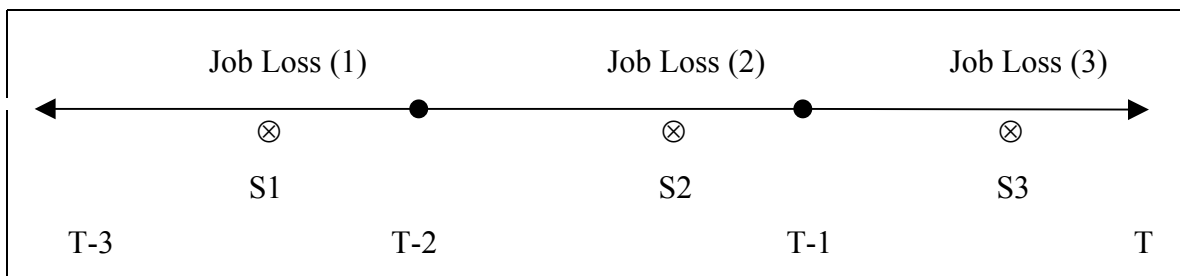
(*)T>S3>T-1 (**) T-1>S2>T-2 (***)T-2>S1>T-3
(**) In T-3 all individuals are employed

If individuals suffer a job loss in S1 (between t-3 and t-2), in t they have been unemployed most of the period considered (3 years). If the job loss occurs in S2, the individual is in t for more than one year (and less than two years) unemployed. Finally, if the individual loses his job in S3, in t the length of the unemployment spell is shorter than one year.

We compare health satisfaction changes between t-3 and t of individuals who suffered job loss in S1, S2 and S3 with health satisfaction changes of individuals who remain employed the whole period.

7.2.c. Model C

In this model, as in model A we consider the period between t-1 and t. However, in this model we don't select individuals who are employed in t-1, but individuals who are unemployed in t-1 in order to analyse the effect of finding a job on health satisfaction.

Only individuals who remain employed and individuals who lose their job and remain unemployed till t are considered. Individuals who lose their job but find another one before t are missing values.

Some of these individuals remain unemployed till t, and some of them find a job between t-1 and t[201]. We analyse the effect on health satisfaction of finding a job taking as a reference group the individuals who remain unemployed.

FIGURE 7. MODEL C. EFFECT OF REEMPLOYMENT ON HEALTH SATISFACTION.
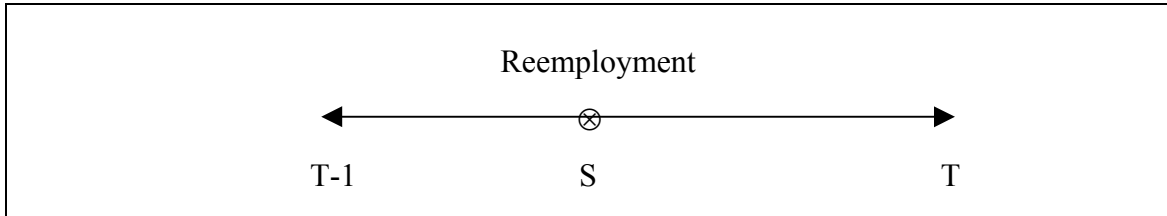
(*)T>S>T-1
(**) In T-1 all individuals are unemployed

In S (a point of time between t-1 and t) some of the individuals who were unemployed in t-1 find a job. We compare health satisfaction changes of these individuals with health satisfaction changes of individuals who remain unemployed.

7.2.d. Other explanatory variables

We described above the three different models used to analyse the effect of short and long-term unemployment and reemployment on health satisfaction.

However, we did not specify which other explanatory variables are used in the multivariate analysis a part from the specified labour market events.

For each of the three models (A,B and C) 4 sub-models have been estimated. In the first one, all the sample is considered. Next, we split the sample into west-Germans and east-Germans[202], and finally, in the fourth sub-model we analyse the effect of job loss/reemployment using interaction effects.

Furthermore, every sub-model is calculated separately for men and women since we identified in the descriptive analysis some differences between men and women in the relationship between labour status and health satisfaction.

In the three models (and the corresponding sub-models) we have included health satisfaction at the beginning of the period as explanatory variable[203]. The idea behind is that individuals with low levels of health satisfaction have more probabilities of reporting positive changes of health satisfaction than individuals with high levels of health

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[201] We don't consider in this model other kind of transitions. Other transitions like going out of the labour market are considered as missing values.
Only individuals who remain unemployed and individuals who find a job and remain employed are considered. Individuals who find a job between t-1 and t but don't remain employed till t are considered missing values.

[202] Living in west-/east-Germany.

[203] Warr P. and Jackson P. (1987) Adapting to the unemployed role: a longitudinal investigation. *Soc.Sci.Med.* Vol.25(11), p. 1219-1224.

satisfaction. And individuals with high levels of health satisfaction have more probabilities of reporting negative changes of health satisfaction than individuals with low levels of health satisfaction.

In table 11 we analyse the relationship between health satisfaction in t-1 and change in health satisfaction (between t-1 and t). We observe that individuals with low levels of health satisfaction (0,1) in t-1 report more often positive changes in health satisfaction than individuals with higher levels of health satisfaction. At the same time, individuals with high levels of health satisfaction (7,..,10) in t-1 report more often negative changes of health satisfaction than individuals with lower levels of health satisfaction.

Other common explanatory variable in all the estimated models is age. As we observe in table 12, older people (between 51 and 65) report less often no changes in health satisfaction and more often positive and negative changes. And younger people (between 21 and 30) and between 31 and 50, report more often no changes in health satisfaction and less often positive and negative changes.

In table 13, we collapsed positive and no changes into one category. We observe that from the three age groups observed, older people (between 50 and 65) report more often negative changes and less often positive and no changes in health satisfaction. While the youngest (not older than 30) report more often positive and no changes and less often negative changes in comparison to the other age groups considered.

Another possible determinant of changes in health satisfaction are changes in household income. We have defined a dummy variable which takes the value 1 if in the considered period there is a negative change in income in the household to which the individual belongs and 0 if there is no change or a positive change in household income.

Living in East-Germany and being foreigner have been also introduced in the models as explanatory variables for changes in health satisfaction. In table 14, where the relationship between being east-German or not and changes in health satisfaction is analysed, we observe that east-Germans report more often than west-Germans negative changes in health satisfaction, and less often positive changes.

In table 15 we analyse the relationship between being foreigner or not and changes in health satisfaction. We observe that the percentage of individuals reporting positive changes in health satisfaction is similar for Germans and for foreigners. However, foreigners report more often negative changes and less often no changes in health satisfaction than Germans.

In the analysis of the distribution of the health satisfaction variable, we pointed out that there is a certain evolution of the responses when a individual stays several waves in the panel[204]. Therefore, we introduce in the models a dummy variable which takes the value 1 if the individual is more than 4 waves in the panel, and takes the value 0 otherwise (if the individual stays less than 4 waves in the panel).

In tables 16 till 21, all explanatory variables (and dependent variables) for all models and sub-models are described.

In tables 18 and 19, where the variables included in Model B are described, we observe that the dummy variable indicating if the individual has been for more than two years unemployed has a mean near to zero and a relative small standard deviation. This is due to the fact that there are few individuals for which this variable takes the value 1 in comparison with the number of individuals for who this variable takes the value 0. However, the number of cases is still sufficient to estimate our model[205].

In the next section, we present the results obtained from the estimation of the models. First, we estimate our models with OLS using pooled data. Although OLS is not the optimal estimation method, OLS results are robust and therefore we analyse them for explorative purposes. Next, we estimate our models using random effects estimators. OLS estimations and random effects estimations have been carried out with the statistical package STATA (versions 7.0 and 8.0).

7.3. Results

7.3.a. OLS Estimations

In tables 22-27 the results of the OLS estimations of the three models and the corresponding sub-models are presented. We used pooled data for these estimations.

In the first chapter we reviewed the main advantages of using panel data. The most remarkable advantage is that with panel data we are able to identify unobservable effects which are not detectable with cross-sectional estimations.

Without forgetting these advantages, we first present the results obtained with pooled data for explorative purposes. In following sections, panel data estimations will be presented.

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[204] Schräpler J-P. (1997) Eine empirische Erklärung von formalen Antwortstilen - Stereotypes Antwortverhalten und Zustimmungstendenzen im Sozio-ökonomischen Panel (SOEP). *Kölner Zeitschrift für Soziologie und Sozialpsychologie* vol. 49(4): 728-746.
Schräpler J-P. (2001) Respondent behavior in panel studies: a case study of the German Socio-Economic Panel (GSOEP). DIW Discussion Paper No. 244.

<u>Model A</u>

The results of the estimation of the model A for the men sub-sample are presented in table 22.

In the estimation of the sub-model A.1 all men are considered. We conclude that job loss (between t-1 and t) has a significant and negative effect on health satisfaction changes for men.

Health satisfaction in t-1 has also a significant and negative effect, which means that the higher the health satisfaction report was in t-1 the less often the individuals report a positive change in health satisfaction between t-1 and t.

Having a negative change in household income between t-1 and t has also a negative and significant effect on change in health satisfaction.

Age has also a negative and significant effect. This means that the older the individuals are, the less often report a positive change in health satisfaction.

To live in East-Germany has also a negative impact on change in health satisfaction. We already observed this feature in the descriptive analysis. In the analysis of tables 7, 9 and 10, we observed that east-Germans tend to report less often than west-Germans positive changes in health satisfaction.

By analysing separately East- and West-Germany (sub-model A.2 and A.3) we observe some differences. While for west-German men job loss has a significant and negative effect on health satisfaction changes, for east-German men this effect is not significant.

Finally, in the sub-model A.4 we control for the effect of job loss by using interaction effects. In this model we observe that health satisfaction in t-1, negative change in household income, age, and being east-German have a negative and significant effect on health satisfaction changes.

From the four interaction effects considered, two are significant. Job loss for individuals older than 50 which has a negative effect on health satisfaction changes. And job loss for individuals who were main earners in t-1[206]. Surprisingly, this last interaction term has a positive effect on health satisfaction changes.

In table 23 the results of the OLS estimations of the model A for the women sub-sample are presented.

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[205] There are 58 men in our sample who are since more than two years unemployed, and 44 women.
[206] In t-1 their partner was unemployed or out of the labour force.

By analysing the results of the estimation of the sub-model A.1 we conclude that, like for the men sub-sample, health satisfaction in t-1, change in household income and age are significant and have a negative effect on health satisfaction changes.

However, for women, job loss between t-1 and t has no significant effect on change in health satisfaction. To live in East-Germany has also no significant effect for women, while it was significant for men.

Being foreigner has, for women, a significant and negative effect on health satisfaction changes.

By analysing the results of the sub-models A.2 and A.3 (for West- and East-Germany) we conclude that job loss between t-1 and t has no significant effect on health satisfaction changes for women, independently if they live in west- or in East-Germany.

Finally, by estimating the sub-model A.4 where the effect of job loss is controlled by interaction effects, we observe that the only interaction term that has a significant effect on changes in health satisfaction is job loss for individuals who are older than 50 years old.

Summarising, after the analysis of the tables 22 and 23 where the results of the OLS estimations of the model A for men and women are presented, we conclude that while for men job loss has a negative effect[207] on health satisfaction changes, for women this effect is not significant.

Health satisfaction in t-1 and age are significant for all sub-models and change in household income is also significant in all sub-models with the exception of west-German women.

In the description of the models we pointed out that in model A we only consider the period between t-1 and t. Some individuals lose in this period their job and we compare changes in health satisfaction of these individuals with individuals who remain employed.

In this model individuals who lose their job are unemployed for a maximum period of one year. Therefore, we can not distinguish between the effect of being less than one year unemployed, and the effect of being for longer time unemployed.

In model B a longer period is considered (between t-3 and t) in order to distinguish between short- and long- term unemployment.

Model B

In table 24 the results of the OLS estimation of the model B for the men sub-sample are presented.

In the sub-model B.1 all men are considered. Again, as in model A, the effect of health satisfaction in the starting period (t-3), age, negative change in household income and being east-German are significant and the corresponding coefficients are negative.

Of the three job loss variables considered, only job loss between t-1 and t is significant. Job loss before t-1 (between t-1 and t-2 or between t-2 and t-3) has no significant effect on health satisfaction changes (between t-3 and t) taking as a reference group individuals who remain employed all the period.

By splitting the sample into west-Germans and east-Germans (sub-models B.2 and B.3) we observe that for both sub-samples job loss between t-1 and t is significant. For east-Germans job loss between t-2 and t-1 is also significant. However, job loss between t-3 and t-2 is not significant for any of the two sub-samples.

By introducing interaction effects in the model (sub-model B.4.) we obtain that job loss is significant and negative for individuals older than 50 years old and for individuals who have children under 16 in the household.

In table 25 the results of the OLS estimations of the model B for the women sub-sample are presented.

When considering all women (sub-model B.1) we obtain that health satisfaction in t-3, age, and being foreigner have a significant effect and the corresponding coefficient of these variables are negative.

However, for the women sub-sample, negative changes in household income are not significant.

Of the job loss variables, only job loss between t-2 and t-3 is significant while job loss between t-2 and t-1 and job loss between t-1 and t are not significant.

In the models sub-model B.2 and B.3 the sample is split into east- and west–Germans. We observe that for west-Germans only job loss between t-2 and t-3 is significant, while for east-Germans none of the job loss variables is significant.

In the sub-model B.4 none of the different interaction terms considered is significant.

Summarising, while for men short term unemployment has a significant and negative effect on health satisfaction changes, for women is long term unemployment what effects negatively changes in health satisfaction.

In model B health satisfaction in t-3 and age are significant in all models, while negative change in household income is significant for men but not for the women sub-sample.

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[207] This effect is not significant for east-Germans.

<u>Model C</u>

Next, in tables 26 and 27 we present the results of the OLS estimations of the model C, where the effect of reemployment on health satisfaction changes is analysed.

In this model, we select individuals who were unemployed in t-1. Some of these individuals find a job between t-1 and t and remain employed till t. Health satisfaction changes of these individuals are compared with health satisfaction changes of individuals who remain unemployed the whole period.

In table 26 the estimations of the model C for the men sub-sample are presented. If we consider all the sub-sample (model C.1) we observe that reemployment has a positive and significant effect on health satisfaction changes.

From the other covariates only health satisfaction in t-1 is significant.

By splitting the sample into East- and West-Germany (sub-model C.2 and C.3) we obtain the same results. For both sub-samples reemployment is significant and the corresponding coefficients are positive.

In the sub-model C.4 the effect of reemployment is controlled by the introduction of different interaction effects. Only reemployment for individuals who were more than 2 years unemployed in t-1 has a significant effect. The corresponding coefficient to this interaction term is positive, which means that the positive effect of reemployment is specially beneficial for individuals who were for more than two years unemployed.

In table 27, the same estimations are carried out for the women sub-sample. If all the sub-sample is considered (sub-model C.1) we observe that for women, reemployment has also a significant and positive effect on health satisfaction changes.

Health satisfaction in t-1 and age are also significant and the corresponding coefficients are negative. High education is also significant and has a positive effect on health satisfaction changes.

By splitting the sample (sub-model C.2 and C.3) we observe similar results. Reemployment is significant and positive for both east-German and west-German sub-sample.

Health satisfaction in t-1 and age are both significant and their coefficients are negative.

In sub-model C.4 were different interaction effect are introduced, we obtain that reemployment for women with children is significant and positive.

Summarising, reemployment has a positive effect on health satisfaction changes. We observe this result in all the sub-models estimated, for both the men and the women sub-sample.

Summary

The main conclusions obtained from these OLS explorative estimations is that while for men short time unemployment has a negative effect on health satisfaction changes, long term unemployment has no significant effect. And for women, while short- term unemployment has no significant effect on health satisfaction changes, long-term unemployment has a significant and negative effect.

Reemployment has for men and women a positive effect on health satisfaction changes.

As pointed out at the beginning of this section, the panel structure of the data should be used in order to reduce biasses introduced by unobserved heterogeneity. Therefore, after these explorative estimations with pooled data, we present in the next section the results obtained by considering the panel structure of our data set.

7.3.b. Random Effects Estimations

In this section we present the results of the random effects estimations of the models A, B and C, and the corresponding sub-models.

A part from the panel structure of the data, the nature of the dependent variable has to be also taken into account when deciding the right estimation method for the models.

Our dependent variable is health satisfaction changes. Since health satisfaction is an ordinal variable with 11 categories (from 0 to 10), health satisfaction differences can take 21 different values. This variable is an ordinal variable, which goes from a minimum value of -10 to a maximum of $+10$.

There is no accepted general method for panel analysis of ordinal data. The alternatives used in the literature have been:

- To collapse the multi-categorical dependent variable into two categories and then estimate the model using the common panel techniques for binary dependent variables (random/fixed effects probit/logit). However, by using this transformation we incur in an important loss of information. See for example Winkelmann and Winkelmann[208].

- If we transform the variable into a binary variable, we can also use GEE (generalised estimating equations). This technique is a recent development in the statistics literature modelling[209] and it is used mostly in epidemiological studies. See Twisk[210], Ziegler et al.[211], Liang and Zeger[212] and Zeger and Liang[213].

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[208] Winkelmann L. and Winkelmann R. (1998) Why are unemployed so unhappy? Evidence from panel data. *Economica* 65, 1-15.
[209] Greene W. (2001) Fixed and random effects in nonlinear models.
http://www.stern.nyu.edu/eco/wkpapers/workingpapers01/EC-01-01.pdf

- Another possibility is the use of Van Praag et al.[214] and later Senik[215] maximum-likelihood ordered logit estimations with variants in which a Mundlak transformation of the exogenous variables reproduces the between (X_i) and within effects (X_{it}-X_i).

- It could be also used for the estimation Generalised Linear Latent and Mixed Models (GLLAMM)[216], which have been recently developed in the biostatistics literature.

- It has been also recently developed a random effects ordinary probit model in STATA[217].

As we already pointed out, by collapsing the 21 categories into 2 categories in order to use a probit/logit or GEE, we incur in an important loss of information, therefore we refuse to use this alternative.

For the other alternatives (ordered probit/logit, GLLAMM) our dependent variable has an excessive number of categories (21). One possibility would be to reduce the number of categories in order to use one of these methods, but again we would incur in an undesirable loss of information.

Therefore, given the large number of categories of the variable, we treat the ordinal dependent variable as a continuous one, and apply the common panel data methodology for continuous variables[218].

In order to decide whether to use random or fixed effect estimators we have first carried out the corresponding Hausman test[219] for our models.

With random effects, we are assuming that the individual effects are random and with fixed effects we assume that they are fixed. For the first case, GLS estimator is the

[210] Twisk J.W.R. (1997) Different statistical models to analyse epidemiological observational longitudinal data: an example form the Amsterdam growth and health study. *Int. J. Sports Med.* 18, S216-S224.

[211] Ziegler A., Kastner C. and Blettner M. (1998) The Generalised Estimating Equations: An Annotated Bibliography. Biometrical Journal 40 (2):115-139.

[212] Liang, K-Y. and Zeger, S.L. (1986) Longitudinal data analysis using Generalized Linear Models. Biometrika 73: 13-22.

[213] Zeger, S.L. and Liang, K-Y. (1986) Longitudinal data analysis for discrete and continuous outcomes. Biometrics 42: 121-130.

[214] van Praag B.M.S., Frijters P. and Ferrer-i-Carbonell A. (2000) A structural model of well-being. Tinbergen Institute Discussion Paper 2000-053/3.

[215] Senik C. (2002) When information dominates comparisons. A panel data analysis using Russian subjective data. DELTA Working Paper N° 2002-02.

[216] Rabe-Hesketh S., Pickles A. and Skrondal A. (2001) GLLAMM Manual. Technical report 2001/01. Department of Biostatistics and Computing. Institute of Psychiatry. King's College, University of London.

[217] STATA Reference Manula. Release 7 (2001) Stata Press: College Station, Texas.

[218] see Gerlach K. and Stephan G. (2001) Lebenszufriedenheit und Erwerbstatus: Ost- und Westdeutschland in Vergleich. *MittAB* 4:515-529.

[219] Hausman J.A. (1978) Specification tests in econometrics. *Econometrica* 46:1251-1271.

BLUE[220] estimator, while for the fixed effects case, the BLUE estimator is the within estimator[221].

One of the assumptions in the random effects models is that explanatory variables and individual effects are independent. With the Hausman test we can test for this assumption. The null hypothesis is that random individual effects and explanatory variables are independent, and the alternative hypothesis is that they are not.

If we don't reject the null hypothesis GLS is the most efficient estimator, while if we reject the null hypothesis GLS is biased and inconsistent[222].

In the tests carried out for our models we don't reject the null hypothesis. Therefore, for our models GLS is the most efficient estimator.

In tables 28-33 the results of the random effects estimations of the models A, B and C and the corresponding sub-models are presented.

Model A

In table 28 the results of the model A estimations for the men sub-sample are presented.

In the sub-model A.1 all men have been considered. Job loss has a significant and negative effect on health satisfaction changes between t-1 and t.

Health satisfaction in t-1 has also a significant effect and the corresponding coefficient is negative. This result confirms what we observed in table 11. Individuals with lower health satisfaction tend to report more often positive changes in health satisfaction, and individuals with high satisfaction levels report less often positive changes in health satisfaction.

Negative changes in household income has a significant and negative effect on health satisfaction changes.

Age affects also negatively health satisfaction changes, which was also predicted in the descriptive analysis (tables 12 and 13). And the dummy variable which indicates if the individual has been for more than 4 waves participating in the panel has a significant and negative effect on health satisfaction changes due to the fact that the responses of the individuals suffer a certain evolution if they remain several waves in the panel.

After splitting the sample into East- and West-Germany (sub-model A.2 and A.3) we observe as in the OLS estimations that job loss has only a significant (and negative) for west-Germans while the effect for east-Germans is not significant.

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[220] Best linear unbiased estimator.
[221] Baltagi B.H. (1995) *Econometric Analysis of Panel Data*. Chichester: John Wiley.
[222] The within estimator is consistent under both the null hypothesis and the alternative hypothesis.

For both models health satisfaction in t-1, age and negative change in household income are significant and the corresponding coefficients are negative.

Being foreigner has a significant and positive effect on health satisfaction changes for West-Germany while this effect is not significant for East-Germany.

The dummy variable indicating long participation of the individual in the panel is only significant for West-Germany and not for East-Germany.

In the sub-model A.4 we control for the effect of job loss by introducing different interaction terms. In this model, health satisfaction in t-1, negative changes in household income, being east-German, and the dummy variable of long participation have a significant and negative effect on health satisfaction changes.

From the interaction effects introduced job loss for individuals who are older than 50 and for individuals who were main earners[223] in t-1 have a significant effect on health satisfaction changes.

Job loss for individuals older than 50 has a negative effect on health satisfaction changes. From this result, we can conclude that age is an stressor of job loss. Or in other words, individuals who are older than 50 years suffer more from a job loss than younger people.

Surprisingly, job loss for main earners has a positive effect on health satisfaction changes. The fact that the partner is unemployed or out of the labour force moderates the effect of own job loss for men, although we expected the opposite result.

One possible explanation for this result is the thesis hold by Clark[224] in the analysis of unemployment as social norm. Clark maintains that the psychological impact of own unemployment may be reduced by a higher level of unemployment among relevant others.

The interaction terms job loss and children, and job loss and high education are not significant.

In table 29 the results of the estimation of the model A for the women sub-sample are presented.

By considering all the sample (sub-model A.1) we don't observe a significant effect of job loss on health satisfaction changes.

Health satisfaction in t-1, negative change in household income, age, being foreigner, and being east-German have a significant and negative effect on health satisfaction changes.

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[223] In t-1 all individuals were employed. Main earners were those individuals whose partners were in t-1 unemployed or out of the labour force.

The dummy variable indicating long participation in the panel is not significant.

By splitting the sample (sub-models A.2 and A.3) we observe in both sub-samples (West-Germany and East-Germany) no effect of job loss on health satisfaction changes.

The variables health satisfaction in t-1, negative change in household income and age have a significant a negative effect on health satisfaction changes.

In the sub-model A.4 where the effect of job loss is controlled by interaction terms, only the interaction term job loss and age is significant and negative. Again, age acts as a stressor of job loss.

Summarising, while for men job loss affects negatively health satisfaction changes, for women job loss is not significant. This result holds for the analysed sub-samples with the exception of east-German men. For men living in East-Germany job loss has no significant effect on health satisfaction changes.

Again we refer to the thesis hold by Clark[225]. The high unemployment rate existing in East-Germany act as a moderator of the individual effect of own job loss.

As we pointed out in past sections, in model A we only analyse short-term unemployment[226] since only the period between t-1 and t is considered. Therefore, we can conclude that short-term unemployment is significant for men but not for women.

From the other covariates considered, health satisfaction in t-1, negative change in household income and age are for all the sub-models significant and the corresponding coefficients are negative. Being east-German has a negative effect on health satisfaction changes for men and for women, and being foreigner has a negative effect on health satisfaction changes only for women.

From the interaction effects analysis, we conclude that age is an stressor of the effect of job loss for both men and women.

Furthermore, if the partner is in t-1 unemployed or out of the labour force the effect of job loss for men is reduced. One plausible explanation for this result is that the effect of unemployment is reduced by the unemployment suffered by the relevant others.

Model B

In tables 30 and 31, the results of the estimation of the model B for men and for women are presented.

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[224] Clark A.E. (2001) Unemployment as a social norm: psychological evidence from panel data. WP October 2001. DELTA (France).
[225] Clark A.E. (2001) Unemployment as a social norm: psychological evidence from panel data. WP October 2001. DELTA (France).
[226] Unemployment spell shorter than one year.

In model B the period between t-3 and t is considered. In t-3 all individuals are employed. From these individuals, some remain employed till t, some lose their job between t-3 and t-2 and remain unemployed till t, others lose their job between t-2 and t-1 and remain unemployed till t, and others lose their job between t-1 and t.

Individuals who lose their job between t-1 and t remain maximum one year in unemployment, as in model A. And individuals who lose their job before t-1 and remain unemployed till t are more than one year unemployed (and more than two years if the individual loses his job between t-2 and t-3).

We compare how these different labour market events affect changes in health satisfaction (between t-3 and t).

In table 30 the results of the analysis for the men sub-sample are presented.

In the sub-model B.1 all the men sample is considered. We observe that health satisfaction in t-3 (at the beginning of the period) is significant and has a negative coefficient. This result was already predicted in the descriptive analysis, and was also obtained in the estimation of the model A.

Age and negative change in household income have also a significant and negative effect on health satisfaction changes. Being east-German and being foreigner has no significant effect on health satisfaction changes for the men sub-sample.

Job loss between t-1 and t is significant (and negative). This result was already obtained in the estimation of the model A.

Job loss between t-2 and t-3 has also a significant and negative effect on health satisfaction changes, this result differs from one obtained with OLS.

Finally, job loss between t-1 and t-2 has not a significant effect on health satisfaction changes.

Summarising, for men, as we already observed in model A, short-term unemployment has an effect on health satisfaction changes. Furthermore, losing the job and remaining more than two years unemployed has also a negative effect on health satisfaction changes.

The coefficient of job loss between t-1 and t is bigger (more negative) than the one corresponding to job loss between t-2 and t-3.

In sub-models B.2 and B.3 we split the sample into West-Germany and East-Germany. For west-German men, we obtain the same results as in the model B.1. Health satisfaction in t-3, negative changes in household income and age have a significant and negative effect on health satisfaction changes.

From the job loss variables, job loss between t-2 and t-3 and job loss between t-1 and t have a significant and negative effect on changes in health satisfaction, while job loss between t-2 and t-1 has no significant effect on health satisfaction changes.

For east-Germans negative changes in household income are not significant. From the job loss variables job loss between t-1 and t and job loss between t-2 and t-1 have a significant effect, while job loss between t-2 and t-3 has no significant effect on health satisfaction changes.

In sub-model B.4, different interaction terms have been considered. In this case we have interact job loss between t-1 and t with other covariates. The reason for using job loss between t-1 and t is that from the different labour market events considered this is the one that has a greater effect on health satisfaction changes.

Job loss for people older than 50 has a significant and negative effect on health satisfaction changes. Again, we conclude that age acts as stressor in a negative event in the labour market.

Job loss for individuals with children under 16 has also a significant and negative effect on health satisfaction changes.

Job loss and high education and job loss and being main earner in t-3 have no significant effect on health satisfaction changes.

In table 31, the results of the estimation of the model B for women are presented.

In the sub-model B.1 all the women sub-sample is considered. From the estimation of this model we obtain that for women health satisfaction in t-3, age and being foreigner have a significant and negative effect on health satisfaction changes.

Negative changes in household income (between t-3 and t) have no significant effect on changes in health satisfaction.

Regarding the job loss variables, only job loss between t-2 and t-3 has a significant effect on health satisfaction changes, and the corresponding coefficient is negative.

For women, losing the job before t-1 and remaining unemployed till t has no significant effect on health satisfaction changes taking as a reference the individuals who remain employed the whole period (before t-3 and t).

From the estimation of the sub-model B.2 (west-German women) we obtain similar results. Health satisfaction in t-3, age and being foreigner have a significant and negative effect on health satisfaction changes, while negative changes in household income have no significant effect on health satisfaction changes.

Only job loss between t-1 and t has a significant effect from the job loss variables. By observing the magnitude of the coefficient we conclude that the effect of job loss between t-2 and t-3 for west-German women is big.

For east-German women (sub-model B.3) job loss has no significant effect on health satisfaction changes, independently if job loss occurred before or after t-1.

Health satisfaction in t-3 and age have a significant and negative effect on health satisfaction changes for east-German women.

In sub-model B.4 we introduce different interaction effects between job loss between t-2 and t-3 and different covariates. We interact job loss between t-2 and t-3 because from the labour market events considered is the one which has an effect on health satisfaction changes.

From the different interaction terms introduced, none has a significant effect on health satisfaction changes.

Summarising, while for men short term unemployment has a significant and negative effect on health satisfaction changes, for women it has not. Long-term unemployment (more than two years) has a significant effect for both, men and women.

We conclude that men suffer in the first months after job loss a bigger impact than women. One plausible explanation for this result is that usually employed women a part from doing their job out of home, are responsible for the housework. This is, most women work at home and out of home. Therefore, the first reaction after job loss may be of relief. After the first year of unemployment the negative effect for men disappears, may be due to an adaptation process. However, after the second year of unemployment we observe again a negative effect on health satisfaction changes.

For women who decide to stay in the labour market after two years of unemployment, unemployment has also a negative effect on health satisfaction changes.

Model C

Finally, in tables 32 and 33 we present the results of the estimation of the model C. With this model we analyse the effect of reemployment on health satisfaction.

The main difference with the other models is the sample selection. While in models A and B all individuals were employed at the beginning of the period, in model C all individuals are unemployed in t-1.

Some of them remain unemployed till t and others find a job between t-1 and t and remain employed till t. We test whether there is a different effect on health satisfaction changes between these two different labour market events.

In table 32 the results of the model C estimation for the men sub-sample are presented.

In sub-model C.1, all men are considered. We observe that reemployment has a significant and positive effect on health satisfaction changes.

Form the other covariates, health satisfaction in t-1 and the dummy variable indicating long participation in the panel have a significant and negative effect on health satisfaction changes.

By splitting the men sample into West- and East-Germany (sub-model C.2 and C.3) we obtain similar results. For both sub-samples reemployment has a significant and positive effect on health satisfaction changes.

In both models, the magnitude of the effect is similar to the magnitude of the effect of the variable health satisfaction in t-1.

In sub-model C.4 interaction effects have been introduced. We interact reemployment with age, having children, being east-German and being for more than 2 years unemployed. None of these interaction effects have a significant effect on health satisfaction changes.

In table 33 we present the results of the estimation of the model C for the women sub-sample.

In sub-model C.1 where all the sub-sample is considered, we observe that reemployment has a significant and positive effect for women.

From the other covariates considered in the model health satisfaction in t-1 and age have a significant and negative effect on health satisfaction changes, and high education and the dummy variable indicating long participation in the panel have a significant and positive effect on changes in health satisfaction.

In the sub-models C.2 and C.3 we consider west- and east-German women separately. For both sub-samples we observe a significant and positive effect of reemployment. Also for both sub-samples, age affects negatively health satisfaction changes.

For west-German women, health satisfaction in t-1 is also significant and the corresponding coefficient has a similar magnitude to the reemployment coefficient but with negative sign.

Long participation has also a significant and positive effect.

For east-German women health satisfaction in t-1 has a significant and negative effect on health satisfaction changes, and the magnitude of the coefficient is bigger than the magnitude of the reemployment coefficient.

In sub-model C.4 only one of the interaction effects introduced is significant. Reemployment for women who have children under 16 in the household is significant and a positive. This may be due to the higher income necessities existing in a household with children under 16.

Summarising, for unemployed men and women, reemployment has a positive effect on health satisfaction, independently from age and independently of the time that the individual was unemployed.

Summary

The main conclusion obtained from random effects estimations is that while for men short term unemployment has a negative effect on health satisfaction changes, for women short term unemployment has not a significant effect on health satisfaction changes. For both sub-samples (men and women) being unemployed more than two years has a significant and negative effect on health satisfaction changes.

Reemployment has for men and women a significant and positive effect on health satisfaction changes.

8. Summary and Conclusions

In the present chapter we have analysed empirically the relationship between health satisfaction and labour status and labour market transitions.

We first described the German Socio-Economic Panel (GSOEP) which is the data set used in the analysis. GSOEP is a representative longitudinal survey of the German population which was started in 1984. We have used for the analysis information contained in the first 18 waves (from 1984 to 2001).

Next, we described the sample selected for the empirical analysis. Only individuals with ages between 21 and 65 years were included. Furthermore, household information was used for further selections. Only individuals belonging to households composed by couples with or without children and which didn't suffer relevant family changes[227] in the considered period were selected. After these first selections, our sample was composed by 127.000 observations.

In section 3 the dependent variable of the analysis (health satisfaction) was described. In past chapters we discussed the advantages of the use of subjective health indicators. In GSOEP there are two subjective health indicators: self-rated health status and health satisfaction. Since health satisfaction was already introduced in the first wave of the

panel, we have a broad information about the evolution of health satisfaction reports of the individuals included in the analysis. Therefore, health satisfaction (concretelly health satisfaction changes) was the dependent variable chosen for the empirical analysis.

Next, we described the labour status variable. This is the variable which effect on health satisfaction we analyse in the empirical analysis.

The next step was to analyse descriptively the relationship between health satisfaction and labour status. We observed that employed individuals were more satisfied with their health than unemployed and individuals who were out of the labour force.

However, this correlation does not imply necessarily that unemployment causes health satisfaction deterioration. As we already pointed out in past chapters, there is a double direction in the relationship between labour status and health. Therefore, we don't know if employed are more satisfied with their health due to the positive effect of employment or whether individuals who are more satisfied with their health have more probabilities to be employed.

In order to solve this problem, we recurred to the longitudinal structure of our data. Due to the panel structure of the GSOEP, we are able compare health satisfaction before and after a labour market event occurs.

We first analysed the relationship between changes in health satisfaction and different labour market transitions occurred between t-1 and t. We did not find evidence of a negative effect on health satisfaction of losing the job.

However, in this first analysis we did not consider the possibility of being more than one year unemployed since the period analysed was comprised between t-1 and t.

In the next step, we analysed changes in health satisfaction (between before and after job loss) for different lengths of unemployment spell.

Again, the we didn't find either evidence of a negative effect of short time unemployment[228]. However, there was an increase of the percentage of negative changes in health satisfaction after the first year of unemployment, although this percentage was reduced again after the second year of unemployment showing evidence of adaptation to unemployment.

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[227] Wedding/marriage, moving in with partner or spouse, divorce, separation from partner or spouse, death of partner or spouse, birth of a child, child moves out and other family changes.
[228] Less than one year.

Summarising, from the descriptive analysis of the relationship between labour status and health satisfaction, we concluded that the effect of unemployment on health satisfaction changes as the period of unemployment increases.

In the multivariate analysis we used three different models to analyse the effect of short and long term unemployment and reemployment on health satisfaction. Every model was estimated separately for men and women. Furthermore, for every sub-sample 4 different sub-models were estimated. The first sub-model includes all the (sub-sample, the second and the third were estimated separately for East- and West-Germany and finally, the in the fourth one different interaction effects were introduced.

In the first model (model A) we considered the period between t-1 and t and we analysed whether or not job loss in this period had an effect on health satisfaction changes.

In t-1 all individuals were employed. And from these individuals, some remained employed and others lost their job and remain unemployed till t[229]. We compared how health satisfaction of individuals who lost their job changed between t-1 and t in relation to individuals who remained employed the whole period.

In the second model (model B) we considered the period between t-3 and t. All individuals were in t-3 employed. Some of them remained all the period employed, some of them lost their job between t-3 and t-2, others between t-2 and t-1, and others between t-1 and t[230].

We analysed whether or not there is a different effect on health satisfaction if the individual lost his job at the beginning of the period or at the end of the period.

Finally, with the third model (model C) we analysed the effect of reemployment on health satisfaction changes. As in the model A, we considered the period between t-1 and t.

All individuals were in t-1 unemployed, and some of these individuals remained unemployed till t, and some of them found a job between t-1 and t[231].

We compared health satisfaction changes of individuals who found a job between t-1 and t with health satisfaction changes of individuals who remained unemployed.

In order to capture the full information of the 11-point satisfaction scale, we treated this variable as a continuous one, and random effects estimations of the models were carried out.

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[229] Other kind of transitions were considered as missing values.
[230] Other kind of transitions were considered as missing values.
[231] Other kind of transitions were considered as missing values.

From models A and B, we concluded that short time unemployment has only a significant (and negative) effect for men. For women, short time unemployment has no significant effect on health satisfaction changes.

One plausible interpretation for this result is that due to the fact that most women who are employed are usually also responsible for housework, a first reaction after job loss may be of relief. They are happy to bear no longer a double burden

However, men suffer a bigger impact the first months after job loss due to the important role that traditionally work has played in men's life.

For women who don't leave the labour market after two years of unemployment, unemployment has a significant and negative effect.

We observe for the men sub-sample certain evidence of adaptation to unemployment after the first year of unemployment. Being unemployed more than one year but less than two has no significant effect on health satisfaction changes. However, being unemployed more than two years has a significant and negative effect on health satisfaction changes.

An interesting result is that short term unemployment is not significant for men living in East-Germany. This result is explained by the high unemployment rates existing in East-Germany. Clark[232] maintains that the psychological impact of own unemployment may be attenuated by a higher level of unemployment among the relevant ones.

Another interesting result is that age acts as a stressor of the effect of unemployment. Individuals older than 50 suffer a bigger impact of job loss. This feature may be caused by the lack of perspectives suffered from individuals after 50 who lose their job.

Finally, we find that reemployment has a significant and positive effect for men and for women, independently from how long individuals have been unemployed.

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[232] Clark A.E. (2001) Unemployment as a social norm: psychological evidence from panel data. WP October 2001. DELTA (France).

TABLES

TABLE 1. HEALTH SATISFACTION FREQUENCIES (ALL SAMPLE)

Health Satisfaction	Percent
0	1,29
1	0,93
2	2,49
3	4,70
4	5,42
5	14,48
6	10,28
7	16,61
8	23,61
9	11,28
10	8,92
	(100%) N=126.363

Pooled data , years 1984-2001   Source: GSOEP

Weighted frequencies. Non-weighted number of observations.

TABLE 2. HEALTH SATISFACTION FREQUENCIES. GROUPED CATEGORIES.

Health Satisfaction	Percent
a. All the sample	
(0,1)	2,22
(2,..,6)	37,37
(7,..,10)	60,41
	100%
	N=126.363
b. Men	
(0,1)	2,17
(2,..,6)	35,84
(7,..,10)	61,99
	100%
	N=63.948
c. Women	
(0,1)	2,19
(2,..,6)	38,93
(7,..,10)	58,80
	100%
	N=62.415
d. West-Germans	
(0,1)	2,26
(2,..,6)	36,35
(7,..,10)	61,39
	100%
	N=99.508
e. East-Germans	
(0,1)	2,19
(2,..,6)	35,16
(7,..,10)	62,65
	100%
	N=26.855
f. Foreigners	
(0,1)	2,67
(2,..,6)	38,64
(7,..,10)	58,91
	100%
	N=26.666
g. No foreigners	
(0,1)	2,19
(2,..,6)	37,23
(7,..,10)	60,58
	100%
	N=99.303

Pooled data , years 1984-2001.   Source: GSOEP
Weighted frequencies. Non-weighted number of observations.

**FIGURE 1. HEALTH SATISFACTION DISTRIBUTION. ONLY MEN.
YEARS 1985, 1992 AND 2001.**

Health Satisfaction Distribution. Men.
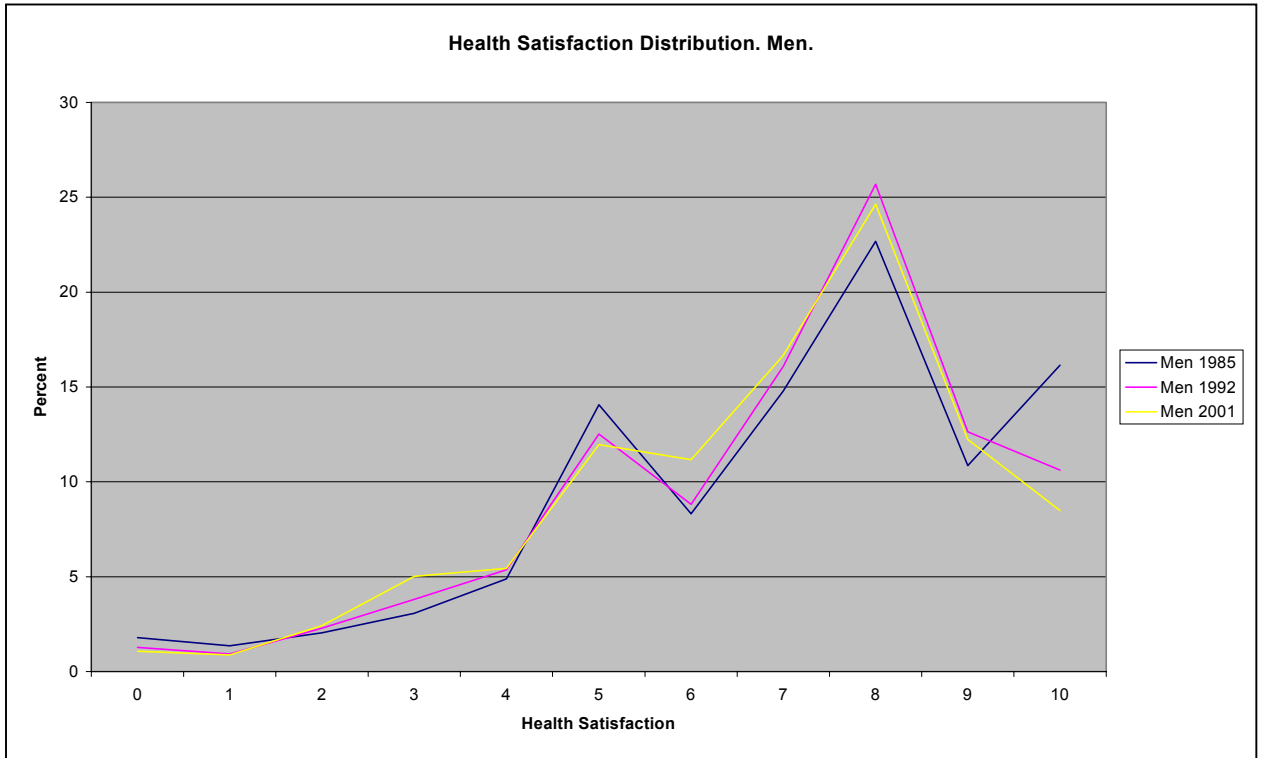
Source: GSOEP

**FIGURE 2. HEALTH SATISFACTION DISTRIBUTION. ONLY WOMEN.
YEARS 1985, 1992 AND 2001.**

Health Satisfaction Distribution. Women.
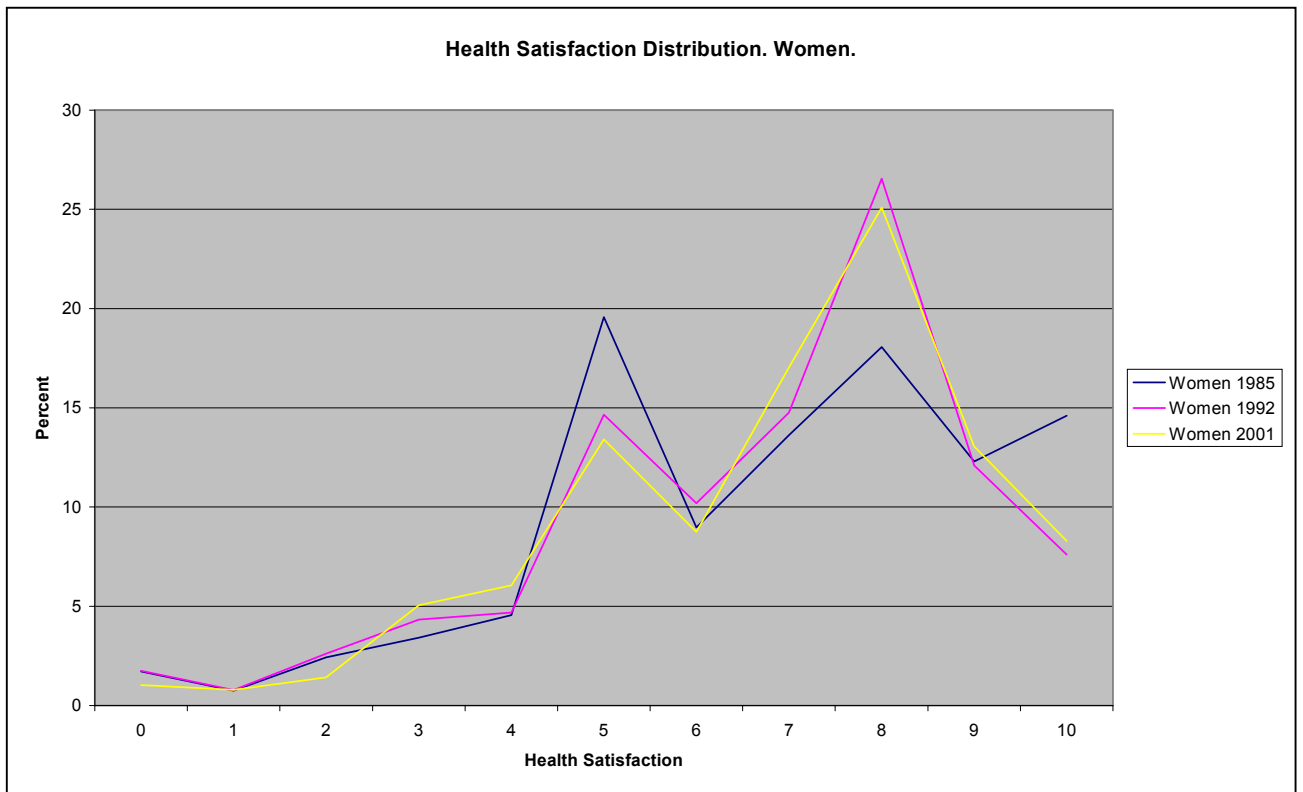
Source: GSOEP

FIGURE 3. HEALTH SATISFACTION DISTRIBUTION. EAST- AND WEST- GERMAN MEN. YEARS 1992 AND 2001.
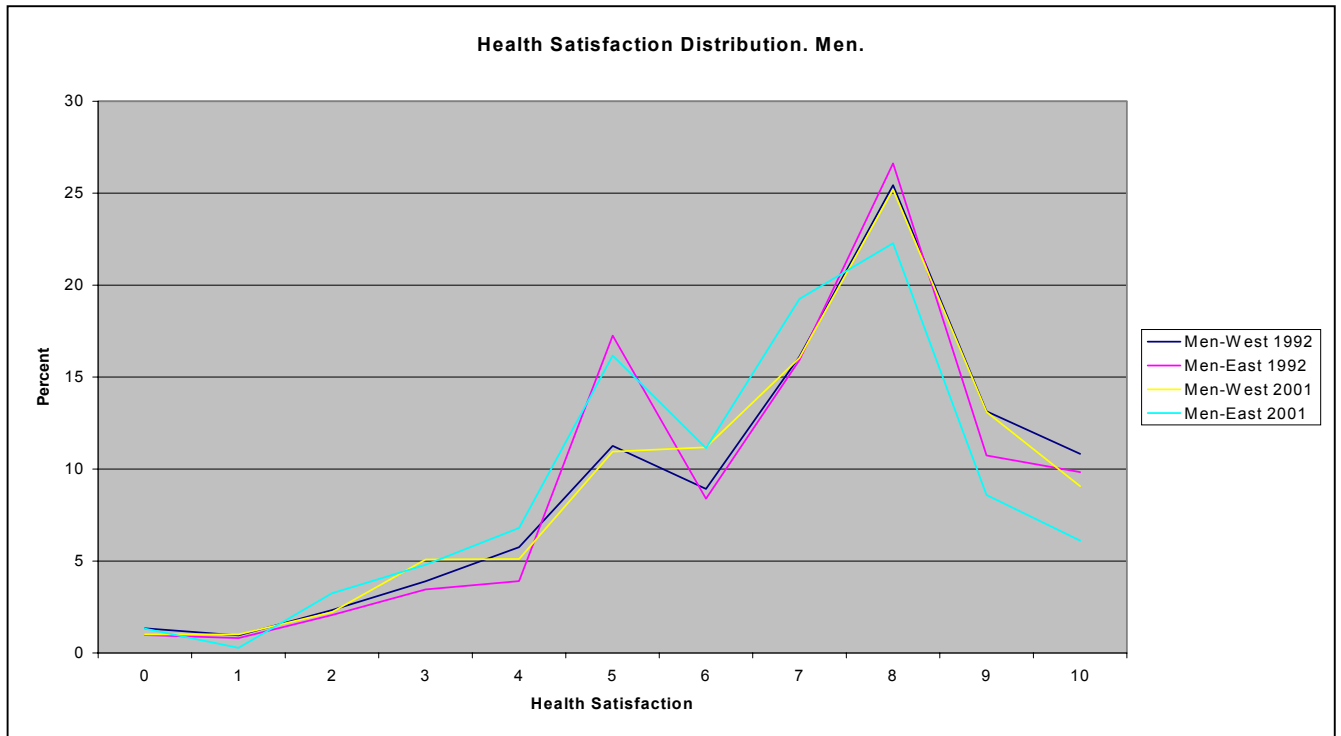
Source: GSOEP

FIGURE 4. HEALTH SATISFACTION DISTRIBUTION. EAST- AND WEST- GERMAN WOMEN. YEARS 1992 AND 2001.
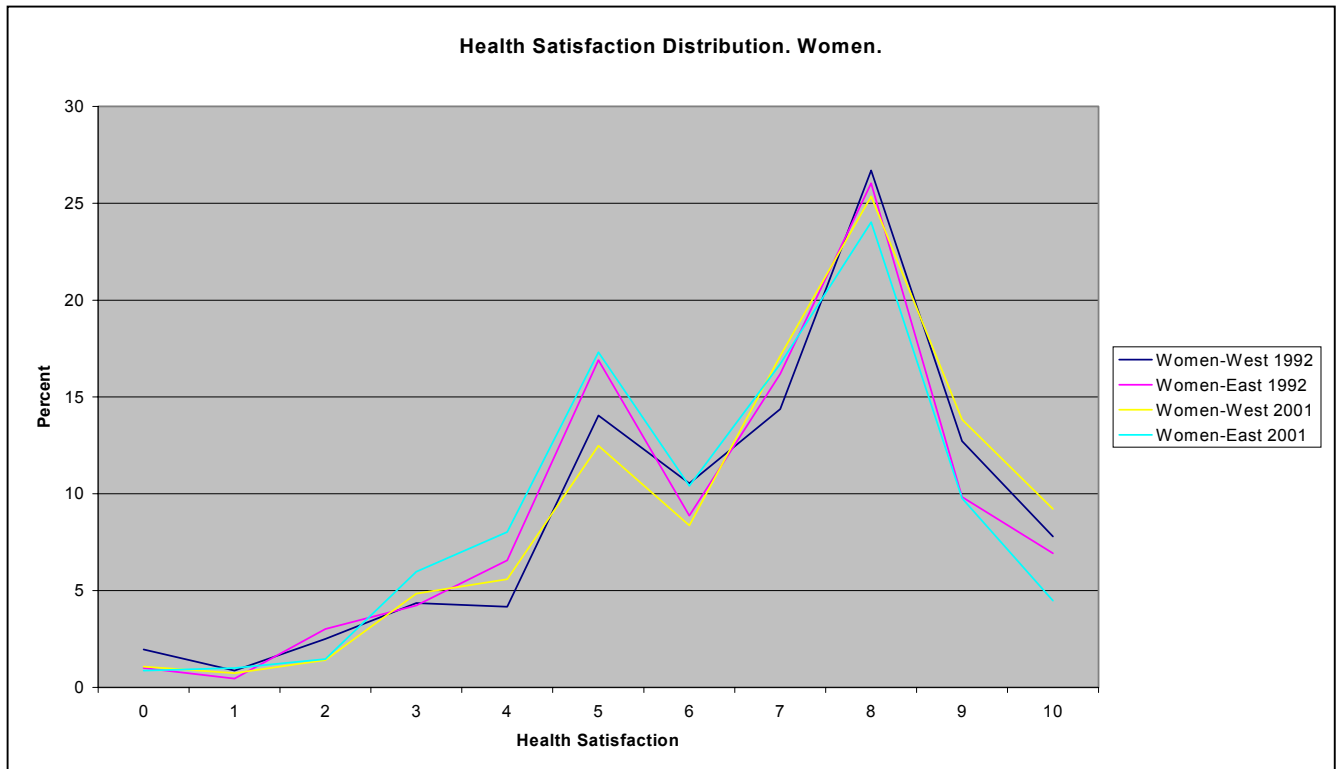
Source: GSOEP

TABLE 3. LABOUR FORCE STATUS FREQUENCIES

Labour Force Status	Percent
a. All the sample	
Working	67,15
Unemployed	5,37
Non-Working	27,48
	(100%)
	N=126.65
b. Men	
Working	78,49
Unemployed	5,72
Non-Working	15,80
	(100%)
	N=64.089
c. Women	
Working	55,65
Unemployed	5,02
Non-Working	39,33
	(100%)
	N=62.561
d. West-Germans	
Working	67,21
Unemployed	4,07
Non-Working	28,72
	(100%)
	N=99.742
e. East-Germans	
Working	66,75
Unemployed	13,18
Non-Working	20,07
	(100%)
	N=26.908
f. Foreigners	
Working	63,47
Unemployed	9,06
Non-Working	27,47
	(100%)
	N=26.757
g. No foreigners	
Working	67,66
Unemployed	4,87
Non-Working	27,47
	(100%)
	N=99.498

Pooled data , years 1984-2001   Source: GSOEP
Weighted frequencies. Non-weighted number of observations

TABLE 4. RELATIONSHIP BETWEEN HEALTH SATISFACTION AND LABOUR STATUS

Health Satisfaction	Working	Unemployed	Non-Working
a. All the sample			
(0,1)	1,26	4,04	4,22
(2,..,6)	33,85	47,92	43,93
(7,..,10)	64,89	48,04	51,85
	(100%)	(100%)	(100%)
	N=87.017	N=7.870	N=31.476
b. Men			
(0,1)	1,19	4,85	6,08
(2,..,6)	32,99	46,08	46,32
(7,..,10)	65,82	49,07	47,60
	(100%)	(100%)	(100%)
	N=51.023	N=4.004	N=8.921
c. Women			
(0,1)	1,36	3,10	3,46
(2,..,6)	35,08	50,06	42,96
(7,..,10)	63,56	46,84	53,58
	(100%)	(100%)	(100%)
	N=35.994	N=3.866	N=22.555
d. West-Germans			
(0,1)	1,29	4,82	4,17
(2,..,6)	33,13	45,99	42,53
(7,..,10)	65,58	49,19	53,30
	(100%)	(100%)	(100%)
	N=68.388	N=4.539	N=26.581
e. East-Germans			
(0,1)	1,04	2,59	4,61
(2,..,6)	38,23	51,52	56,00
(7,..,10)	60,73	45,89	39,38
	(100%)	(100%)	(100%)
	N=18.629	N=3.331	N=4.895
f. Foreigners			
(0,1)	1,50	4,53	3,98
(2,..,6)	35,40	45,11	44,01
(7,..,10)	63,10	50,36	52,01
	(100%)	(100%)	(100%)
	N=17.592	N=2.247	N=6.827
g. No foreigners			
(0,1)	1,22	3,95	4,26
(2,..,6)	33,63	48,86	44,05
(7,..,10)	65,14	47,19	51,69
	(100%)	(100%)	(100%)
	N=69.158	N=5.597	N=24.548

Pooled data , years 1984-2001   Source: GSOEP
Weighted frequencies. Non-weighted number of observations.

TABLE 5. RELATIONSHIP BETWEEN HEALTH SATISFACTION IN T-1 AND LABOUR STATUS IN T

Health Satisfaction in T-1	Working in T	Unemployed in T	Non-Working in T		N
a. All the sample					
(0,1)	77,31	6,84	15,85	(100%)	N=793
(2,..,6)	90,17	3,87	5,97	(100%)	N=21.696
(7,..,10)	93,94	2,25	3,81	(100%)	N=41.207
b. Men					
(0,1)	74,06	7,23	18,71	(100%)	N=430
(2,..,6)	91,80	3,80	4,40	(100%)	N=12.357
(7,..,10)	94,92	2,13	2,95	(100%)	N=24.747
c. Women					
(0,1)	81,52	6,34	12,14	(100%)	N=363
(2,..,6)	87,97	3,95	8,08	(100%)	N=9.339
(7,..,10)	92,44	2,44	5,13	(100%)	N=16.460
d. West-Germans					
(0,1)	78,22	5,51	16,27	(100%)	N=665
(2,..,6)	91,03	2,73	6,24	(100%)	N=16.532
(7,..,10)	94,37	1,65	3,97	(100%)	N=32.552
e. East-Germans					
(0,1)	68,48	19,78	11,74	(100%)	N=128
(2,..,6)	85,60	9,89	4,50	(100%)	N=5.164
(7,..,10)	91,09	6,16	2,75	(100%)	N=8.655
f. Foreigners					
(0,1)	77,76	8,97	13,28	(100%)	N=213
(2,..,6)	89,34	5,17	5,49	(100%)	N=4.582
(7,..,10)	92,82	3,44	3,74	(100%)	N=8.302
g. Not foreigners					
(0,1)	78,01	6,59	15,40	(100%)	N=579
(2,..,6)	90,26	3,71	6,03	(100%)	N=17.062
(7,..,10)	94,10	2,09	3,81	(100%)	N=32.802

Pooled data , years 1984-2001   Source: GSOEP
Only individuals who were employed in T-1.
Weighted frequencies. Non-weighted number of observations.

TABLE 6. RELATIONSHIP BETWEEN HEALTH SATISFACTION AND DEATH IN THE FOLLOWING YEARS

Health Satisfaction	No Death in the observed period	Death within 1 year	Death within 3 years (death within 1 year not included)	Death within 5 years (death within 3 years not included)	N
(0,1)	89,21	3,77	4,49	2,54	(100%) N=2.548
(2,..,6)	97,37	0,51	1,13	0,99	(100%) N=45.389
(7,..,10)	99,17	0,12	0,33	0,38	(100%) N=76.935

Pooled data , years 1984-2001   Source: GSOEP

Weighted frequencies. Non-weighted number of observations

TABLE 7. RELATIONSHIP BETWEEN DIFFERENT TRANSITIONS IN THE LABOUR MARKET AND CHANGES IN HEALTH SATISFACTION

Change in Health Satisfaction	T-1: Unemp. T: Working	T-1: Working T: Unemp.	T-1: Unemp. T: Unemp.	T-1: Working T: Working	Others
a. All the sample					
>0	34,22	35,36	34,68	32,14	34,85
=0	28,07	28,62	28,58	31,64	30,04
<0	37,72	36,02	36,74	36,22	35,11
	(100%) *N=1.607*	*(100%)* *N=2.145*	*(100%)* *N=2.865*	*(100%)* *N=58.987*	*(100%)* *N=26.091*
b. Men					
>0	34,89	36,03	34,73	31,87	35,25
=0	27,19	29,14	29,51	31,83	30,27
<0	37,92	34,83	35,75	36,30	34,48
	(100%) *N=821*	*(100%)* *N=1.172*	*(100%)* *N=1.460*	*(100%)* *N=35.209*	*(100%)* *N=7.692*
c. Women					
>0	33,46	34,48	34,61	32,55	34,68
=0	29,05	27,94	27,39	31,36	29,94
<0	37,48	37,58	38,00	36,09	35,38
	(100%) *N=786*	*(100%)* *N=973*	*(100%)* *N=1.405*	*(100%)* *N=23.778*	*(100%)* *N=18.399*
d. West-Germans					
>0	35,47	36,66	36,30	32,47	34,76
=0	25,72	27,5	27,43	31,57	30,06
<0	38,82	35,83	36,27	35,96	35,18
	(100%) *N=854*	*(100%)* *N=1.149*	*(100%)* *N=1.603*	*(100%)* *N=46.472*	*(100%)* *N=21.784*
e. East-Germans					
>0	32,25	33,23	31,81	30,05	35,61
=0	31,77	30,45	30,61	32,11	29,86
<0	35,98	36,32	37,58	37,84	34,53
	(100%) *N=753*	*(100%)* *N=996*	*(100%)* *N=1.262*	*(100%)* *N=12.515*	*(100%)* *N=4.307*
f. Foreigners					
>0	41,44	33,47	33,52	33,13	35,08
=0	27,08	28,86	31,16	29,51	29,04
<0	31,48	37,36	35,32	37,36	35,89
	(100%) *N=352*	*(100%)* *N=516*	*(100%)* *N=879*	*(100%)* *N=12.099*	*(100%)* *N=5.665*
g. No foreigners					
>0	33,11	35,66	35,01	32,02	34,83
=0	28,41	28,65	27,71	31,96	30,15
<0	38,48	35,69	37,28	36,02	35,02
	(100%) *N=1.251*	*(100%)* *N=1.624*	*(100%)* *N=1.979*	*(100%)* *N=46.745*	*(100%)* *N=20.358*

Pooled data , years 1984-2001   Source: GSOEP
Weighted frequencies. Non-weighted number of observations.

**TABLE 8. RELATIONSHIP BETWEEN HEALTH SATISFACTION AND LENGTH
OF THE UNEMPLOYMENT SPELL**

Health Satisfaction	Working	Unemployed ≤12 months	Unemployed >12 months and ≤24	Unemployed >24 months and ≤36
a. All the sample				
(0,1)	1,26	3,76	3,20	5,12
(2,..,6)	33,85	44,70	52,38	61,90
(7,..,10)	64,89	51,54	44,42	32,98
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=87.017	*N=5.670*	*N=1.120*	*N=522*
b. Men				
(0,1)	1,19	4,41	2,86	7,45
(2,..,6)	32,99	43,98	49,75	53,65
(7,..,10)	65,82	51,61	47,38	38,90
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=51.023	*N=2.888*	*N=527*	*N=255*
c. Women				
(0,1)	1,36	3,02	3,56	2,61
(2,..,6)	35,08	45,51	55,19	70,8
(7,..,10)	63,56	51,47	41,24	26,59
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=35.994	*N=2,782*	*N=593*	*N=267*
d. West-Germans				
(0,1)	1,29	4,51	3,36	6,97
(2,..,6)	33,13	42,33	51,93	59,40
(7,..,10)	65,58	53,16	44,70	33,63
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=68.388	*N=3.171*	*N=626*	*N=330*
e. East-Germans				
(0,1)	1,04	2,41	2,94	1,18
(2,..,6)	38,23	48,94	53,11	67,22
(7,..,10)	60,73	48,65	43,95	31,60
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=18.629	*N=2.499*	*N=494*	*N=192*
f. Foreigners				
(0,1)	1,50	4,38	3,18	8,84
(2,..,6)	35,40	44,04	40,12	49,57
(7,..,10)	63,10	51,58	56,69	41,59
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=17.592	*N=1.438*	*N=327*	*N=200*
g. No foreigners				
(0,1)	1,22	3,65	3,22	3,82
(2,..,6)	33,63	45,09	55,63	66,42
(7,..,10)	65,14	51,26	41,15	29,76
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=69.158	*N=4.209*	*N=792*	*N=321*

Pooled data , years 1984-2001   Source: GSOEP
Weighted frequencies. Non-weighted number of observations.

TABLE 9. RELATIONSHIP BETWEEN LENGTH OF THE UNEMPLOYMENT SPELL AND CHANGE IN HEALTH SATISFACTION (BETWEEN BEFORE AND DURING THE UNEMPLOYMENT EXPERIENCE)

Change in Health Satisfaction	T-1: Working T: Working	T: Unemployed ≤12 months	T: Unemployed >12 months and ≤24	T: Unemployed >24 months and ≤36
a. All the sample				
>0	32,14	35,24	32,15	35,86
=0	31,64	28,55	27,65	25,53
<0	36,22	36,21	40,21	38,61
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=58.987	*N=2.083*	*N=484*	*N=206*
b. Men				
>0	31,87	35,88	33,02	40,04
=0	31,83	28,82	23,80	16,65
<0	36,30	35,30	43,18	43,32
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=35.209	*N=1.128*	*N=243*	*N=99*
c. Women				
>0	32,55	34,42	31,20	31,45
=0	31,36	28,19	31,83	34,92
<0	36,09	37,39	36,97	33,63
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=23.778	*N=955*	*N=241*	*N=107*
d. West-Germans				
>0	32,47	36,74	30,03	40,13
=0	31,57	27,19	28,20	23,75
<0	35,96	36,08	41,77	36,12
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=46.472	*N=1.103*	*N=268*	*N=123*
e. East-Germans				
>0	30,05	32,84	35,53	27,31
=0	32,11	30,72	26,77	29,11
<0	37,84	36,43	37,70	43,58
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=12.515	*N=980*	*N=216*	*N=83*
f. Foreigners				
>0	33,13	32,68	41,86	41,01
=0	29,51	28,07	18,87	20,75
<0	37,36	39,25	39,27	38,24
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=12.099	*N=493*	*N=138*	*N=77*
g. No foreigners				
>0	32,02	35,65	30,02	34,30
=0	31,96	28,71	29,57	26,98
<0	36,02	35,63	40,41	38,72
	(100%)	*(100%)*	*(100%)*	*(100%)*
	N=46.745	*N=1.585*	*N=346*	*N=129*

Pooled data , years 1984-2001   Source: GSOEP

Weighted frequencies. Non-weighted number of observations.

TABLE 10. RELATIONSHIP BETWEEN LENGTH OF THE UNEMPLOYMENT SPELL AND CHANGE IN HEALTH SATISFACTION BETWEEN T-1 AND T.

Change in Health Satisfaction	T-1: Working T: Working	T: Unemployed ≤3 months	T: Unemployed >3 months and ≤12
a. All the sample			
>0	32,14	35,49	34,92
=0	31,64	29,93	26,76
<0	36,22	34,57	38,32
	(100%) *N=58.987*	*(100%)* *N=1.161*	*(100%)* *N=922*
b. Men			
>0	31,87	36,15	35,44
=0	31,83	31,85	24,04
<0	36,30	32,00	40,52
	(100%) *N=35.209*	*(100%)* *N=682*	*(100%)* *N=446*
c. Women			
>0	32,55	34,45	34,40
=0	31,36	26,89	29,48
<0	36,09	38,66	36,12
	(100%) *N=23.778*	*(100%)* *N=479*	*(100%)* *N=476*
d. West-Germans			
>0	32,47	36,80	36,65
=0	31,57	29,07	24,59
<0	35,96	34,13	38,76
	(100%) *N=46.472*	*(100%)* *N=617*	*(100%)* *N=486*
e. East-Germans			
>0	30,05	33,21	32,42
=0	32,11	31,43	29,91
<0	37,84	35,35	37,68
	(100%) *N=12.515*	*(100%)* *N=544*	*(100%)* *N=436*
f. Foreigners			
>0	33,13	29,56	37,18
=0	29,51	27,62	28,72
<0	37,36	42,82	34,10
	(100%) *N=12.099*	*(100%)* *N=267*	*(100%)* *N=226*
g. No foreigners			
>0	32,02	36,73	34,29
=0	31,96	30,36	26,64
<0	36,02	32,92	39,07
	(100%) *N=46.745*	*(100%)* *N=891*	*(100%)* *N=694*

Pooled data , years 1984-2001   Source: GSOEP

Weighted frequencies. Non-weighted number of observations.

TABLE 11. RELATIONSHIP BETWEEN HEALTH SATISFACTION IN T-1 AND CHANGE IN HEALTH SACTION BETWEEN T-1 AND T.

Change in Health Satisfaction	Health Satisfaction T-1 (0,1)	Health Satisfaction T-1 (2,..,6)	Health Satisfaction T-1 (7,..,10)
>0	72,30	51,95	19,87
=0	23,18	23,70	35,79
<0	4,53	24,35	44,33
	(100%) N=1.897	(100%) N=33.979	(100%) N=55.819

Pooled data , years 1984-2001   Source: GSOEP

Weighted frequencies. Non-weighted number of observations.

TABLE 12. RELATIONSHIP BETWEEN AGE IN T-1 AND CHANGE IN HEALTH SACTION BETWEEN T-1 AND T.

Change in Health Satisfaction	Age T-1 (21-30)	Age T-1 (31-50)	Age T-1 (51-65)
>0	31,71	32,57	34,68
=0	33,55	31,44	29,01
<0	34,74	35,99	36,31
	(100%) N=16.468	(100%) N=48.920	(100%) N=26.307

Pooled data , years 1984-2001   Source: GSOEP
Weighted frequencies. Non-weighted number of observations.

TABLE 13. RELATIONSHIP BETWEEN AGE IN T-1 AND CHANGE IN HEALTH SACTION BETWEEN T-1 AND T.

Change in Health Satisfaction	Age T-1 (21-30)	Age T-1 (31-50)	Age T-1 (51-65)
>=0	65,26	64,01	63,69
<0	34,74	35,99	36,31
	(100%) N=16.468	(100%) N=48.920	(100%) N=26.307

Pooled data , years 1984-2001   Source: GSOEP
Weighted frequencies. Non-weighted number of observations.

TABLE 14. RELATIONSHIP BETWEEN WEST-/EAST-GERMANS AND CHANGE IN HEALTH SACTION BETWEEN T-1 AND T.

Change in Health Satisfaction	West-Germans(*)	East-Germans(**)
>0	33,38	31,76
=0	30,88	31,37
<0	35,74	36,87
	(100%) N=71.862	(100%) N=19.833

Pooled data , years 1984-2001   Source: GSOEP
Weighted frequencies. Non-weighted number of observations.
(*)Individuals living in West-Germany.
(**)Individuals living in East-Germany.

TABLE 15. RELATIONSHIP BETWEEN BEING GERMAN OR FOREIGNER AND CHANGE IN HEALTH SACTION BETWEEN T-1 AND T.

Change in Health Satisfaction	Germans(*)	Foreigners(**)
>0	33,06	33,92
=0	31,18	29,38
<0	35,76	36,70
	(100%) N=71.957	(100%) N=19.511

Pooled data , years 1984-2001   Source: GSOEP
Weighted frequencies. Non-weighted number of observations.
(*)Born in Germany or immigrated to Germany before 1949.
(**)Immigration year>1949.

TABLE 16. DESCRIPTION OF THE DEPENDENT AND EXPLANATORY VARIABLES OF THE MODEL A. MEN.

Variables	Description	Mean and Std. Deviation(+)			
		Model A.1	Model A.2	Model A.3	Model A.4
Change in Health Satisfaction (++)	Health Satisfaction Changes (between T-1 and T)	-0,10 (1,90)	-0,10 (1,93)	-0,11 (1,75)	-0,10 (1,90)
Health Satisfaction in T-1	Reported Health Satisfaction in T-1	7,07 (2,07)	7,11 (2,09)	6,86 (1,93)	7,07 (2,07)
Change in Household Income	=0 if there is a positive change or no change in household income. =1 if there is a negative change in household income between T-1 and T	0,32 (0,47)	0,33 (0,47)	0,31 (0,46)	0,32 (0,47)
Age T-1	Age in T-1	41,03 (10,70)	41,00 (10,81)	41,13 (10,21)	--- ---
No German	=0 if the individual was born in Germany or immigrated before 1949 =1 if the individual immigrated after 1949	0,22 (0,42)	0,27 (0,44)	0,01 (0,09)	0,22 (0,42)
East German	=0 if the individual lives in West-Germany =1 if the individual lives in East-Germany	0,18 (0,39)	--- ---	--- ---	0,18 (0,39)
Job Loss	=0 if the individual remains employed =1 if the individual loses his job between T-1 and T and remains unemployed at least till T	0,20 (0,14)	0,15 (0,12)	0,04 (0,21)	--- ---
Long Participation	=0 if the individual participates less than 4 waves (or 4 waves) in the panel =1 if the individual participates more than 4 waves	0,44 (0,50)	0,45 (0,50)	0,35 (0,48)	0,44 (0,50)
Job Loss*Age	Interaction Variable: Job loss and a dummy variable which takes the value 1 if the individual is older than 50 years old and 0 otherwise	--- ---	--- ---	--- ---	0,01 (0,09)
Job Loss*Children	Interaction Variable: Job loss and a dummy variable which takes the value 1 if there are children under 16 in the household and 0 otherwise	--- ---	--- ---	--- ---	0,01 (0,09)
Job Loss*High Education	Interaction Variable: Job loss and a dummy variable which takes the value 1 if the individual has completed a college education or a vocational training and 0 otherwise	--- ---	--- ---	--- ---	0,02 (0,12)
Job Loss*Main Earner	Interaction Variable: Job loss and a dummy variable which takes the value 1 if the partner is unemployed or out of the labour force in T-1 and 0 if the partner is working in T-1	--- ---	--- ---	--- ---	0,01 (0,09)

(+) Stad. Dev. in brackets. (++) Dependent variable.   Source: GSOEP
Model A.1: All sample. Model A.2: West-Germany.
Model A.3: East-Germany. Model A.4: All sample-Interaction effects

TABLE 17. DESCRIPTION OF THE DEPENDENT AND EXPLANATORY VARIABLES OF THE MODEL A. WOMEN.

Variables	Description	Mean and Std. Deviation(+)			
		Model A.1	Model A.2	Model A.3	Model A.4
Change in Health Satisfaction (++)	Health Satisfaction Changes (between T-1 and T)	-0,11 (1,99)	-0,10 (2,04)	-0,12 (1,85)	-0,11 (1,99)
Health Satisfaction in T-1	Reported Health Satisfaction in T-1	6,92 (2,10)	6,96 (2,14)	6,78 (1,96)	6,92 (2,10)
Change in Household Income	=0 if there is a positive change or no change in household income. =1 if there is a negative change in household income between T-1 and T	0,32 (0,47)	0,33 (0,47)	0,29 (0,45)	0,32 (0,47)
Age T-1	Age in T-1	39,46 (10,31)	39,34 (10,48)	39,85 (9,69)	--- ---
No German	=0 if the individual was born in Germany or immigrated before 1949 =1 if the individual immigrated after 1949	0,19 (0,39)	0,24 (0,43)	0,01 (0,12)	0,19 (0,39)
East German	=0 if the individual lives in West-Germany =1 if the individual lives in East-Germany	0,23 (0,42)	--- ---	--- ---	0,23 (0,42)
Job Loss	=0 if the individual remains employed =1 if the individual loses his job between T-1 and T and remains unemployed at least till T	0,03 (0,16)	0,02 (0,13)	0,06 (0,24)	--- ---
Long Participation	=0 if the individual participates less than 4 waves (or 4 waves) in the panel =1 if the individual participates more than 4 waves	0,38 (0,49)	0,40 (0,49)	0,34 (0,47)	0,38 (0,49)
Job Loss*Age	Interaction Variable: Job loss and a dummy variable which takes the value 1 if the individual is older than 50 years old and 0 otherwise	--- ---	--- ---	--- ---	0,01 (0,09)
Job Loss*Children	Interaction Variable: Job loss and a dummy variable which takes the value 1 if there are children under 16 in the household and 0 otherwise	--- ---	--- ---	--- ---	0,01 (0,11)
Job Loss*High Education	Interaction Variable: Job loss and a dummy variable which takes the value 1 if the individual has completed a college education or a vocational training and 0 otherwise	--- ---	--- ---	--- ---	0,02 (0,14)
Job Loss*Main Earner	Interaction Variable: Job loss and a dummy variable which takes the value 1 if the partner is unemployed or out of the labour force in T-1 and 0 if the partner is working in T-1	--- ---	--- ---	--- ---	0,00 (0,06)

(+) Stad. Dev. in brackets. (++) Dependent variable.　　　　　　　　Source: GSOEP
Model A.1: All sample. Model A.2: West-Germany.
Model A.3: East-Germany. Model A.4: All sample-Interaction effects

TABLE 18. DESCRIPTION OF THE DEPENDENT AND EXPLANATORY VARIABLES OF THE MODEL B. MEN.

Variables	Description	Mean and Std. Deviation(+)			
		Model B.1	Model B.2	Model B.3	Model B.4
Change in Health Satisfaction(++)	Health Satisfaction Changes (between T-3 and T)	-0,29 (2,06)	-0,27 (2,09)	-0,35 (1,89)	-0,29 (2,06)
Health Satisfaction in T-3	Reported Health Satisfaction in T-3	7,08 (2,07)	7,12 (2,10)	6,90 (1,93)	7,08 (2,07)
Change in Household Income	=0 if there is a positive change or no change in household income. =1 if there is a negative change in household income between T-3 and T	0,25 (0,43)	0,26 (0,44)	0,24 (0,43)	0,25 (0,43)
Age T-3	Age in T-3	43,33 (9,53)	43,40 (9,63)	42,93 (8,96)	--- ---
No German	=0 if the individual was born in Germany or immigrated before 1949 =1 if the individual immigrated after 1949	0,23 (0,42)	0,27 (0,45)	0,01 (0,08)	0,23 (0,42)
East German	=0 if the individual lives in West-Germany =1 if the individual lives in East-Germany	0,18 (0,38)	--- ---	--- ---	0,18 (0,38)
Job Loss S1	=0 if the individual remains employed =1 if the individual loses his job between T-3 and T-2 and remains unemployed at least till T	0,00 (0,06)	0,00 (0,06)	0,01 (0,07)	--- ---
Job Loss S2	=0 if the individual remains employed =1 if the individual loses his job between T-2 and T-1 and remains unemployed at least till T	0,01 (0,09)	0,01 (0,08)	0,02 (0,12)	--- ---
Job Loss S3	=0 if the individual remains employed =1 if the individual loses his job between T-1 and T and remains unemployed at least till T	0,01 (0,12)	0,01 (0,10)	0,03 (0,18)	--- ---
Long Participation	=0 if the individual participates less than 4 waves (or 4 waves) in the panel =1 if the individual participates more than 4 waves	0,40 (0,49)	0,43 (0,50)	0,28 (0,45)	--- ---
Job Loss S3*Age	Interaction Variable: Job loss S3 and a dummy variable which takes the value 1 if the individual is older than 50 years old and 0 otherwise	--- ---	--- ---	--- ---	0,01 (0,10)
Job Loss S3*Children	Interaction Variable: Job loss S3 and a dummy variable which takes the value 1 if there are children under 16 in the household and 0 otherwise	--- ---	--- ---	--- ---	0,01 (0,07)
Job Loss S3*High Education	Interaction Variable: Job loss S3 and a dummy variable which takes the value 1 if the individual has completed a college education or a vocational training and 0 otherwise	--- ---	--- ---	--- ---	0,01 (0,10)

Job Loss S3*Main Earner	Interaction Variable: Job loss S3 and a dummy variable which takes the value 1 if the partner is unemployed or out of the labour force in T-1 and 0 if the partner is working in T-1	--- ---	--- ---	--- ---	0,01 (0,08)

(+) Stad. Dev. in brackets. (++) Dependent variable.   Source: GSOEP

Model B.1: All sample. Model B.2: West-G. Model B.3: East-G. Model B.4: All sample-Interaction effects

TABLE 19. DESCRIPTION OF THE DEPENDENT AND EXPLANATORY VARIABLES OF THE MODEL B. WOMEN.

Variables	Description	Mean and Std. Deviation(+)			
		Model B.1	Model B.2	Model B.3	Model B.4
Change in Health Satisfaction(++)	Health Satisfaction Changes (between T-3 and T)	-0,27 (2,15)	-0,25 (2,19)	-0,31 (2,03)	-0,27 (2,15)
Health Satisfaction in T-3	Reported Health Satisfaction in T-3	6,89 (2,11)	6,93 (2,15)	6,77 (1,98)	6,89 (2,11)
Change in Household Income	=0 if there is a positive change or no change in household income. =1 if there is a negative change in household income between T-3 and T	0,26 (0,44)	0,27 (0,45)	0,23 (0,42)	0,26 (0,44)
Age T-3	Age in T-3	41,95 (9,33)	42,05 (9,42)	41,61 (9,00)	--- ---
No German	=0 if the individual was born in Germany or immigrated before 1949 =1 if the individual immigrated after 1949	0,20 (0,40)	0,25 (0,43)	0,02 (0,13)	0,20 (0,40)
East German	=0 if the individual lives in West-Germany =1 if the individual lives in East-Germany	0,23 (0,42)	--- ---	--- ---	0,23 (0,42)
Job Loss S1	=0 if the individual remains employed =1 if the individual loses his job between T-3 and T-2 and remains unemployed at least till T	0,01 (0,07)	0,00 (0,06)	0,01 (0,09)	--- ---
Job Loss S2	=0 if the individual remains employed =1 if the individual loses his job between T-2 and T-1 and remains unemployed at least till T	0,01 (0,09)	0,01 (0,09)	0,01 (0,12)	--- ---
Job Loss S3	=0 if the individual remains employed =1 if the individual loses his job between T-1 and T and remains unemployed at least till T	0,02 (0,12)	0,01 (0,11)	0,00 (0,15)	--- ---
Long Participation	=0 if the individual participates less than 4 waves (or 4 waves) in the panel =1 if the individual participates more than 4 waves	0,35 (0,48)	0,38 (0,48)	0,26 (0,44)	--- ---
Job Loss S3*Age	Interaction Variable: Job loss S3 and a dummy variable which takes the value 1 if the individual is older than 50 years old and 0 otherwise	--- ---	--- ---	--- ---	0,00 (0,06)
Job Loss S3*Children	Interaction Variable: Job loss S3 and a dummy variable which takes the value 1 if there are children under 16 in the household and 0 otherwise	--- ---	--- ---	--- ---	0,00 (0,03)
Job Loss S3*High Education	Interaction Variable: Job loss S3 and a dummy variable which takes the value 1 if the individual has completed a college education or a vocational training and 0 otherwise	--- ---	--- ---	--- ---	0,00 (0,06)

| Job Loss S3*Main Earner | Interaction Variable: Job loss S3 and a dummy variable which takes the value 1 if the partner is unemployed or out of the labour force in T-1 and 0 if the partner is working in T-1 | ---
 --- | ---
 --- | ---
 --- | 0,00
 (0,04) |

(+) Stad. Dev. in brackets. (++) Dependent variable.   Source: GSOEP

Model B.1: All sample. Model B.2: West-G. Model B.3: East-G. Model B.4: All sample-Interaction effects

TABLE 20. DESCRIPTION OF THE DEPENDENT AND EXPLANATORY VARIABLES OF THE MODEL C. MEN.

Variables	Description	Mean and Std. Deviation(+)			
		Model C.1	Model C.2	Model C.3	Model C.4
Change in Health Satisfaction (++)	Health Satisfaction Changes (between T-1 and T)	-0,06 (2,20)	-0,02 (2,32)	-0,16 (1,95)	-0,06 (2,20)
Health Satisfaction in T-1	Reported Health Satisfaction in T-1	6,26 (2,50)	6,28 (2,66)	6,20 (2,13)	6,26 (2,50)
Change in Household Income	=0 if there is a positive change or no change in household income. =1 if there is a negative change in household income between T-1 and T	0,31 (0,46)	0,33 (0,47)	0,26 (0,44)	0,31 (0,46)
Age T-1	Age in T-1	47,96 (12,13)	47,25 (12,27)	49,63 (11,62)	--- ---
No German	=0 if the individual was born in Germany or immigrated before 1949 =1 if the individual immigrated after 1949	0,33 (0,47)	0,49 (0,50)	0,02 (0,14)	0,33 (0,47)
East German	=0 if the individual lives in West-Germany =1 if the individual lives in East-Germany	0,33 (0,47)	--- ---	--- ---	--- ---
High Educated	=1 if the individual has completed a college education or a vocational training =0 otherwise	0,63 (0,48)	0,51 (0,50)	0,92 (0,27)	0,63 (0,48)
Reemployment	=0 if the individual remains unemployed =1 if the individual finds a job between T-1 and T and remains employed at least till T	0,37 (0,48)	0,35 (0,48)	0,42 (0,49)	--- ---
Long Participation	=0 if the individual participates less than 4 waves (or 4 waves) in the panel =1 if the individual participates more than 4 waves	0,08 (0,26)	0,10 (0,30)	0,03 (0,18)	0,08 (0,26)
Reemployment*Age	Interaction Variable: Reemployment and a dummy variable which takes the value 1 if the individual is older than 50 years old and 0 otherwise	--- ---	--- ---	--- ---	0,07 (0,26)
Reemployment*Children	Interaction Variable: Reemployment and a dummy variable which takes the value 1 if there are children under 16 in the household and 0 otherwise	--- ---	--- ---	--- ---	0,20 (0,40)
Reemployment*East-Germany	Interaction Variable: Reemployment and a dummy variable which takes the value 1 if the individual lives in east-Germany and 0 otherwise	--- ---	--- ---	--- ---	0,14 (0,34)
Reemployment*>24 months unemployed	Interaction Variable: Job loss and a dummy variable which takes the value 1 if the individual has been till T-1 more than 24 months unemployed and 0 otherwise	--- ---	--- ---	--- ---	0,31 (0,46)

(+) Stad. Dev. in brackets. (++) Dependent variable.   Source: GSOEP
Model C.1: All sample. Model C.2: West-G. Model C.3: East-G. Model C.4: All sample-Interaction effects

TABLE 21. DESCRIPTION OF THE DEPENDENT AND EXPLANATORY VARIABLES OF THE MODEL C. WOMEN.

Variables	Description	Mean and Std. Deviation(+)			
		Model C.1	Model C.2	Model C.3	Model C.4
Change in Health Satisfaction (++)	Health Satisfaction Changes (between T-1 and T)	-0,02 (2,06)	-0,01 (2,12)	-0,03 (2,00)	-0,02 (2,06)
Health Satisfaction in T-1	Reported Health Satisfaction in T-1	6,19 (2,35)	6,23 (2,47)	6,15 (2,22)	6,19 (2,35)
Change in Household Income	=0 if there is a positive change or no change in household income. =1 if there is a negative change in household income between T-1 and T	0,32 (0,46)	0,33 (0,47)	0,30 (0,46)	0,32 (0,46)
Age T-1	Age in T-1	45,23 (11,52)	45,26 (12,19)	45,20 (10,97)	--- ---
No German	=0 if the individual was born in Germany or immigrated before 1949 =1 if the individual immigrated after 1949	0,21 (0,43)	0,44 (0,50)	0,03 (0,17)	0,21 (0,43)
East German	=0 if the individual lives in West-Germany =1 if the individual lives in East-Germany	0,48 (0,50)	--- ---	--- ---	--- ---
High Educated	=1 if the individual has completed a college education or a vocational training =0 otherwise	0,71 (0,45)	0,52 (0,50)	0,86 (0,35)	0,71 (0,45)
Reemployment	=0 if the individual remains unemployed =1 if the individual finds a job between T-1 and T and remains employed at least till T	0,37 (0,48)	0,39 (0,49)	0,35 (0,48)	--- ---
Long Participation	=0 if the individual participates less than 4 waves (or 4 waves) in the panel =1 if the individual participates more than 4 waves	0,07 (0,26)	0,05 (0,22)	0,10 (0,30)	0,07 (0,26)
Reemployment*Age	Interaction Variable: Reemployment and a dummy variable which takes the value 1 if the individual is older than 50 years old and 0 otherwise	--- ---	--- ---	--- ---	0,06 (0,23)
Reemployment*Children	Interaction Variable: Reemployment and a dummy variable which takes the value 1 if there are children under 16 in the household and 0 otherwise	--- ---	--- ---	--- ---	0,20 (0,40)
Reemployment*East-Germany	Interaction Variable: Reemployment and a dummy variable which takes the value 1 if the individual lives in east-Germany and 0 otherwise	--- ---	--- ---	--- ---	0,18 (0,39)
Reemployment*>24 months unemployed	Interaction Variable: Job loss and a dummy variable which takes the value 1 if the individual has been till T-1 more than 24 months unemployed and 0 otherwise	--- ---	--- ---	--- ---	0,29 (0,45)

(+) Stad. Dev. in brackets. (++) Dependent variable.   Source: GSOEP
Model C.1: All sample. Model C.2: West-G. Model C.3: East-G. Model C.4: All sample-Interaction effects

TABLE 22. MODEL A: OLS RESULTS. POOLED DATA YEARS: 1984-2001. MEN.

EFFECT OF SHORT UNEMPLOYMENT EXPERIENCE ON CHANGE IN HEALTH SATISFACTION.								
	MODEL A.1		MODEL A.2		MODEL A.3		MODEL A.4	
			West-Germany		East-Germany			
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	3,876 ****	(0,005)	3,861 ****	(0,062)	3,839 ****	(0,135)	2,902 ****	(0,049)
H. Satisf. T-1	-0,444 ****	(0,018)	-0,446 ****	(0,005)	-0,437 ****	(0,012)	-0,420 ****	(0,006)
Change HH Inc. (<0=1)	-0,079 ****	(0,001)	-0,064 ***	(0,020)	-0,151 ****	(0,040)	-0,102 ****	(0,022)
Age T-1	-0,019 ****	(0,021)	-0,019 ****	(0,001)	-0,022 ****	(0,002)		
No German=1	0,038	(0,021)	0,041	(0,021)	-0,287	(0,241)	0,026	(0,026)
East German=1	-0,112 ****	(0,066)					-0,132 ****	(0,025)
Job Loss S(*)	-0,160 **	(0,017)	-0,207 **	(0,089)	-0,058	(0,096)		
Long Participation (**)	-0,008	(0,057)	-0,014	(0,019)	0,023	(0,037)	-0,055 ***	(0,021)
Job Loss*Age (>50=1)							-0,457 ***	(0,160)
Job Loss*Children							-0,009	(0,168)
Job Loss*High Education							-0,068	(0,148)
Job Loss*Main Earner (T-1)							0,350 **	(0,167)
	N=41.084		N=33.576		N=7.508		N=26.777	
	F=1.204,62****		F=1.167,02****		F=242,90****		F=557,97****	
	Adj R-sq.=0,2222		Adj R-sq.=0,2227		Adj R-sq.=0,2205		Adj R-sq.=0,2062	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP

(*) T>S>T-1   (**) More than 4 waves participating in GSOEP

**p<.05, ***p<.01, ****p<.001

Model A.1: All sample. Model A.2: West-Germany.

Model A.3: East-Germany. Model A.4: All sample-Interaction effects

TABLE 23. MODEL A: OLS RESULTS. POOLED DATA YEARS: 1984-2001. WOMEN.

EFFECT OF SHORT UNEMPLOYMENT EXPERIENCE ON CHANGE IN HEALTH SATISFACTION.								
	MODEL A.1		MODEL A.2 West-Germany		MODEL A.3 East-Germany		MODEL A.4	
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	4,181 ****	(0,072)	4,204 ****	(0,083)	3,951 ****	(0,142)	3,132 ****	(0,062)
H. Satisf. T-1	-0,484 ****	(0,006)	-0,489 ****	(0,007)	-0,465 ****	(0,012)	-0,455 ****	(0,008)
Change HH Inc. (<0=1)	-0,048 **	(0,023)	-0,035	(0,027)	-0,095 **	(0,046)	-0,102 ****	(0,029)
Age T-1	-0,022 ****	(0,001)	-0,022 ****	(0,001)	-0,023 ****	(0,002)		
No German=1	-0,163 ****	(0,029)	-0,162 ****	(0,030)	-0,268	(0,146)	-0,211 ****	(0,037)
East German=1	-0,142	(0,025)					-0,161 ****	(0,030)
Job Loss S(*)	-0,109	(0,069)	-0,154	(0,103)	-0,049	(0,093)		
Long Participation (**)	0,020	(0,022)	0,018	(0,026)	0,029	(0,042)	-0,037	(0,027)
Job Loss*Age (>50=1)							-0,791 ****	(0,200)
Job Loss*Children							-0,211	(0,184)
Job Loss*High Education							0,193	(0,160)
Job Loss*Main Earner (T-1)							0,039	(0,260)
	N=26.915		N=20.574		N=6.341		N=17.017	
	F=875,90****		F=788,96****		F=244,37****		F=406,00****	
	Adj R-sq.=0,2432		Adj R-sq.=0,2476		Adj R-sq.=0,2264		Adj R-sq.=0,2271	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP
(*) T>S>T-1   (**) More than 4 waves participating in GSOEP
**p<.05, ***p<.01, ****p<.001
Model A.1: All sample. Model A.2: West-Germany.
Model A.3: East-Germany. Model A.4: All sample-Interaction effects

TABLE 24. MODEL B: OLS RESULTS. POOLED DATA YEARS: 1984-2001. MEN.

EFFECT OF SHORT AND LONG UNEMPLOYMENT EXPERIENCE ON CHANGE IN HEALTH SATISFACTION.								
	MODEL B.1		MODEL B.2		MODEL B.3		MODEL B.4	
			West-Germany		East-Germany			
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	4,072 ****	(0,123)	4,061 ****	(0,133)	4,049 ****	(0,297)	3,092 ****	(0,086)
H. Satisf. T-3	-0,481 ****	(0,010)	-0,479 ****	(0,010)	-0,492 ****	(0,025)	-0,472 ****	(0,010)
Change HH Inc. (<0=1)	-0,117 ***	(0,042)	-0,138 ***	(0,046)	-0,003	(0,094)	-0,170 ****	(0,043)
Age T-3	-0,022 ****	(0,002)	-0,022 ****	(0,002)	-0,021 ****	(0,005)		
No German=1	0,006	(0,042)	0,007	(0,042)	0,167	(0,303)	-0,008	(0,043)
East German=1	-0,090 **	(0,044)					-0,078	(0,045)
Job Loss S1(*)	-0,398	(0,293)	-0,502	(0,364)	-0,113	(0,399)		
Job Loss S2(**)	-0,399	(0,208)	-0,283	(0,267)	-0,706 **	(0,273)		
Job Loss S3(***)	-0,483 ***	(0,167)	-0,480 **	(0,218)	-0,524 **	(0,239)		
Long Participation (****)	0,088 **	(0,043)	0,103 **	(0,049)	0,026	(0,084)	0,046	(0,044)
Job Loss (S3)*Age (>50=1)							-0,868 ***	(0,313)
Job Loss (S3)*Children							-0,693 **	(0,313)
Job Loss (S3)*High Education							0,004	(0,319)
Job Loss (S3)*Main Earner (T-1)							0,553	(0,362)
	N=10.816		N=9.301		N=1.515		N=10.239	
	F=282,03****		F=273,27****		F=50,68****		F=257,68****	
	Adj R-sq.=0,2374		Adj R-sq.=0,2372		Adj R-sq.=0,2417		Adj R-sq.=0,2312	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP
(*) T>S3>T-1 (**) T-1>S2>T-2 (***) T-2>S1>T-3 (****) More than 4 waves participating in GSOEP
**p<.05, ***p<.01, ****p<.001
Model B.1: All sample. Model B.2: West-Germany.
Model B.3: East-Germany. Model B.4: All sample-Interaction effects

TABLE 25. MODEL B: OLS RESULTS. POOLED DATA YEARS: 1984-2001. WOMEN.

EFFECT OF SHORT AND LONG UNEMPLOYMENT EXPERIENCE ON CHANGE IN HEALTH SATISFACTION.								
	MODEL B.1		MODEL B.2		MODEL B.3		MODEL B.4	
			West-Germany		East-Germany			
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	4,447 ****	(0,169)	4,475 ****	(0,194)	4,230 ****	(0,314)	3,425 ****	(0,116)
H. Satisf. T-3	-0,512 ****	(0,013)	-0,513 ****	(0,015)	-0,509 ****	(0,027)	-0,501 ****	(0,014)
Change HH Inc. (<0=1)	-0,074	(0,053)	-0,045	(0,061)	-0,166	(0,111)	-0,139 **	(0,055)
Age T-3	-0,024 ****	(0,003)	-0,025 ****	(0,003)	-0,020 ****	(0,005)		
No German=1	-0,203 ***	(0,063)	-0,192 ***	(0,064)	-0,473	(0,318)	-0,252 ****	(0,066)
East German=1	-0,099	(0,054)					-0,090	(0,056)
Job Loss S1(*)	-0,683 **	(0,300)	-0,904 **	(0,385)	-0,318	(0,454)		
Job Loss S2(**)	-0,073	(0,224)	-0,384	(0,267)	0,471	(0,372)		
Job Loss S3(***)	-0,374	(0,217)	-0,345	(0,243)	-0,507	(0,479)		
Long Participation (****)	-0,033	(0,058)	0,002	(0,071)	-0,112	(0,096)	-0,096	(0,060)
Job Loss (S1)*Age (>50=1)							-1,152	(0,842)
Job Loss (S1)*Children							-0,875	(1,173)
Job Loss (S1)*High Education							0,299	(1,102)
Job Loss (S1)*Main Earner (T-3)							0,274	(0,638)
	N=5.977		N=4.696		N=1.281		N=5.578	
	F=167,70****		F=145,35****		F=47,91****		F=152,48****	
	Adj R-sq.=0,2548		Adj R-sq.=0,2563		Adj R-sq.=0,2523		Adj R-sq.=0,2466	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP

(*) T>S3>T-1 (**) T-1>S2>T-2 (***) T-2>S1>T-3 (****) More than 4 waves participating in GSOEP

**p<.05, ***p<.01, ****p<.001

Model B.1: All sample. Model B.2: West-Germany.

Model B.3: East-Germany. Model B.4: All sample-Interaction effects

TABLE 26. MODEL C: OLS RESULTS. POOLED DATA YEARS: 1984-2001. MEN.

EFFECT OF REEMPLOYMENT ON CHANGE IN HEALTH SATISFACTION.								
	MODEL C.1		MODEL C.2		MODEL C.3		MODEL C.4	
			West-Germany		East-Germany			
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	2,576 ****	(0,400)	2,387 ****	(0,448)	3,401 ****	(0,858)	2,252 ****	(0,240)
H. Satisf. T-1	-0,404 ****	(0,028)	-0,371 ****	(0,031)	-0,578 ****	(0,067)	-0,393 ****	(0,028)
Change HH Inc. (<0=1)	-0,188	(0,139)	0,000	(0,000)	0,000	(0,000)	0,000 **	(0,000)
Age T-1	-0,004	(0,006)	-0,006	(0,007)	-0,005	(0,011)		
No German=1	0,002	(0,165)	0,010	(0,167)	-2,066	(1,377)	0,037	(0,151)
East German=1	-0,176	(0,171)						
High Educated=1	-0,029	(0,150)	-0,051	(0,166)	0,053	(0,344)	-0,050	(0,151)
Reemployment S(*)	0,629 ****	(0,158)	0,543 **	(0,209)	0,726 ***	(0,256)		
Long Participation (**)	-0,260	(0,166)	-0,177	(0,176)	-1,068 **	(0,475)	-0,285	(0,167)
Reemployment*Age (>50=1)							0,315	(0,263)
Reemployment*Children							0,074	(0,209)
Reemployment*East German							0,310	(0,256)
Reemployment*>24m.unemp.							0,587 **	(0,247)
	N=940		N=671		N=269		N=940	
	F=27,46****		F=20,66****		F=13,91****		F=24,73****	
	Adj R-sq.=0,2150		Adj R-sq.=0,1977		Adj R-sq.=0,3005		Adj R-sq.=0,2087	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP

(*) T>S>T-1   (**) More than 4 waves participating in GSOEP

**p<.05, ***p<.01, ****p<.001

Model B.1: All sample. Model B.2: West-Germany.

Model B.3: East-Germany. Model B.4: All sample-Interaction effects

TABLE 27. MODEL C: OLS RESULTS. POOLED DATA YEARS: 1984-2001. WOMEN.

	MODEL C.1		MODEL C.2 West-Germany		MODEL C.3 East-Germany		MODEL C.4	
EFFECT OF REEMPLOYMENT ON CHANGE IN HEALTH SATISFACTION.								
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	3,973 ****	(0,448)	4,044 ****	(0,639)	3,910 ****	(0,654)	2,171 ****	(0,223)
H. Satisf. T-1	-0,500 ****	(0,033)	-0,512 ****	(0,050)	-0,491 ****	(0,044)	-0,446 ****	(0,031)
Change HH Inc. (<0=1)	0,166	(0,134)	0,000	(0,000)	0,000 **	(0,000)	0,000	(0,000)
Age T-1	-0,033 ****	(0,006)	-0,033 ***	(0,010)	-0,035 ****	(0,009)	0,296	(0,168)
No German=1	0,232	(0,183)	0,204	(0,212)	0,350	(0,356)		
East German=1	-0,144	(0,149)						
High Educated=1	0,328 **	(0,162)	0,311	(0,228)	0,378	(0,237)	0,338 **	(0,164)
Reemployment S(*)	0,564 ****	(0,142)	0,614 **	(0,259)	0,570 ***	(0,176)		
Long Participation (**)	0,421 ***	(0,130)	0,667 ***	(0,214)	0,283	(0,162)	0,261	(0,141)
Reemployment*Age (>50=1)							-0,007	(0,271)
Reemployment*Children							0,553 **	(0,258)
Reemployment*East German							0,106	(0,251)
Reemployment*>24m.unemp.							0,422	(0,249)
	N=860		N=344		N=516		N=860	
	F=31,87****		F=18,33****		F=19,81****		F=24,62****	
	Adj R-sq.=0,2701		Adj R-sq.=0,2904		Adj R-sq.=0,2561		Adj R-sq.=0,2323	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP
(*) T>S>T-1   (**) More than 4 waves participating in GSOEP
**p<.05, ***p<.01, ****p<.001
Model B.1: All sample. Model B.2: West-Germany.
Model B.3: East-Germany. Model B.4: All sample-Interaction effects

TABLE 28. MODEL A: RANDOM EFFECTS ESTIMATIONS. YEARS: 1984-2001. MEN.

EFFECT OF SHORT UNEMPLOYMENT EXPERIENCE ON CHANGE IN HEALTH SATISFACTION.								
	MODEL A.1		MODEL A.2		MODEL A.3		MODEL A.4	
			West-Germany		East-Germany			
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	5,475 ****	(0,060)	5,385 ****	(0,065)	5,685 ****	(0,141)	3,887 ****	(0,045)
H. Satisf. T-1	-0,619 ****	(0,005)	-0,613 ****	(0,005)	-0,643 ****	(0,011)	-0,558 ****	(0,006)
Change HH Inc. (<0=1)	-0,072 ****	(0,017)	-0,060 ***	(0,019)	-0,133 ****	(0,037)	-0,094 ****	(0,021)
Age T-1	-0,028 ****	(0,001)	-0,027 ****	(0,001)	-0,033 ****	(0,003)		
No German=1	0,056	(0,029)	0,058 **	(0,029)	-0,364	(0,280)	0,034	(0,032)
East German=1	-0,150 ****	(0,030)					-0,169 ****	(0,034)
Job Loss S(*)	-0,156 ***	(0,057)	-0,208 ***	(0,074)	-0,048	(0,086)		
Long Participation (**)	-0,071 ****	(0,018)	-0,075 ****	(0,020)	-0,051	(0,038)	-0,134 ****	(0,020)
Job Loss*Age (>50=1)							-0,518 ***	(0,152)
Job Loss*Children							-0,047	(0,148)
Job Loss*High Education							-0,049	(0,138)
Job Loss*Main Earner (T-1)							0,370 **	(0,151)
	N=41.084		N=33.576		N=7.508		N=26.777	
	Wald chi2(7)=		Wald chi2(6)=		Wald chi2(6)=		Wald chi2(9)=	
	18.555,65****		14.920,35****		3.628,49****		10.157,01****	
	Rho=0,1711		Rho=0,1543		Rho=0,2579		Rho=0,1179	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP

(*) T>S>T-1   (**) More than 4 waves participating in GSOEP

**p<.05, ***p<.01, ****p<.001

Model A.1: All sample. Model A.2: West-Germany.

Model A.3: East-Germany. Model A.4: All sample-Interaction effects

TABLE 29. MODEL A: RANDOM EFFECTS ESTIMATIONS. YEARS: 1984-2001. WOMEN.

EFFECT OF SHORT UNEMPLOYMENT EXPERIENCE ON CHANGE IN HEALTH SATISFACTION..								
	MODEL A.1		MODEL A.2		MODEL A.3		MODEL A.4	
			West-Germany		East-Germany			
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	5,452 ****	(0,072)	5,453 ****	(0,081)	5,301 ****	(0,151)	4,198 ****	(0,057)
H. Satisf. T-1	-0,629 ****	(0,006)	-0,633 ****	(0,006)	-0,617 ****	(0,012)	-0,606 ****	(0,007)
Change HH Inc. (<0=1)	-0,044 **	(0,022)	-0,027 ****	(0,026)	-0,102 **	(0,044)	-0,096 ***	(0,028)
Age T-1	-0,028 ****	(0,001)	-0,027 ****	(0,002)	-0,031 ****	(0,003)		
No German=1	-0,202 ****	(0,036)	-0,200	(0,037)	-0,314	(0,223)	-0,270 ****	(0,045)
East German=1	-0,182 ****	(0,033)					-0,220 ****	(0,041)
Job Loss S(*)	-0,099	(0,064)	-0,148	(0,093)	-0,026	(0,086)		
Long Participation (**)	-0,021	(0,023)	-0,025	(0,027)	-0,008	(0,044)	-0,097 ****	(0,026)
Job Loss*Age (>50=1)							-0,791 ****	(0,191)
Job Loss*Children							-0,192	(0,167)
Job Loss*High Education							0,198	(0,146)
Job Loss*Main Earner (T-1)							-0,048	(0,234)
	N=26.915		N=20.574		N=6.341		N=17.017	
	Wald chi2(7)=		Wald chi2(6)=		Wald chi2(6)=		Wald chi2(9)=	
	12.544,37****		9.793,46****		2.738,19****		7.416,32****	
	Rho=0,1323		Rho=0,1274		Rho=0,1612		Rho=0,1356	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP

(*) T>S>T-1   (**) More than 4 waves participating in GSOEP

**p<.05, ***p<.01, ****p<.001

Model A.1: All sample. Model A.2: West-Germany.

Model A.3: East-Germany. Model A.4: All sample-Interaction effects

TABLE 30. MODEL B: RANDOM EFFECTS ESTIMATIONS. YEARS: 1984-2001. MEN.

EFFECT OF SHORT AND LONG UNEMPLOYMENT EXPERIENCE ON CHANGE IN HEALTH SATISFACTION.								
	MODEL B.1		MODEL B.2		MODEL B.3		MODEL B.4	
			West-Germany		East-Germany			
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	6,608 ****	(0,140)	6,747 ****	(0,153)	5,729 ****	(0,343)	4,950 ****	(0,082)
H. Satisf. T-3	-0,751 ****	(0,009)	-0,766 ****	(0,010)	-0,670 ****	(0,025)	-0,734 ****	(0,010)
Change HH Inc. (<0=1)	-0,101 ***	(0,037)	-0,118 ***	(0,041)	0,003	(0,086)	-0,153 ****	(0,039)
Age T-3	-0,037 ****	(0,003)	-0,038 ****	(0,003)	-0,032 ****	(0,006)		
No German=1	0,028	(0,063)	0,030	(0,065)	-0,143	(0,969)	-0,003	(0,064)
East German=1	-0,124	(0,068)					-0,115	(0,070)
Job Loss S1(*)	-0,600 **	(0,242)	-0,679 **	(0,281)	-0,348	(0,439)		
Job Loss S2(**)	-0,303	(0,176)	-0,191	(0,208)	-0,601 **	(0,304)		
Job Loss S3(***)	-0,448 ***	(0,129)	-0,450 ***	(0,156)	-0,450 **	(0,214)		
Long Participation (****)	0,044	(0,038)	0,056	(0,043)	0,001	(0,074)	-0,049	(0,039)
Job Loss (S3)*Age (>50=1)							-0,902 ***	(0,283)
Job Loss (S3)*Children							-0,657 **	(0,265)
Job Loss (S3)*High Education							0,090	(0,272)
Job Loss (S3)*Main Earner (T-3)							0,469	(0,283)
	N=10.816		N=9.301		N=1.515		N=10.239	
	Wald chi2(9)=		Wald chi2(8)=		Wald chi2(8)=		Wald chi2(9)=	
	6.587,92****		5.879,35****		738,73****		5.957,17****	
	Rho=0,3428		Rho=0,3508		Rho=0,3526		Rho=0,3345	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP
(*) T>S3>T-1 (**) T-1>S2>T-2 (***) T-2>S1>T-3 (****) More than 4 waves participating in GSOEP
**p<.05, ***p<.01, ****p<.001
Model B.1: All sample. Model B.2: West-Germany.
Model B.3: East-Germany. Model B.4: All sample-Interaction effects

TABLE 31. MODEL B: RANDOM EFFECTS ESTIMATIONS. YEARS: 1984-2001. WOMEN.

EFFECT OF SHORT AND LONG UNEMPLOYMENT EXPERIENCE ON CHANGE IN HEALTH SATISFACTION.								
	MODEL B.1		MODEL B.2		MODEL B.3		MODEL B.4	
			West-Germany		East-Germany			
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	6,511 ****	(0,181)	6,638 ****	(0,205)	5,961 ****	(0,376)	5,040 ****	(0,109)
H. Satisf. T-3	-0,745 ****	(0,012)	-0,756 ****	(0,014)	-0,707 ****	(0,027)	-0,735 ****	(0,013)
Change HH Inc. (<0=1)	-0,068	(0,050)	-0,033	(0,057)	-0,201	(0,103)	-0,120 **	(0,052)
Age T-3	-0,036 ****	(0,004)	-0,037 ****	(0,004)	-0,030 ****	(0,007)		
No German=1	-0,250 ***	(0,086)	-0,240 ***	(0,088)	-0,510	(0,559)	-0,325 ****	(0,089)
East German=1	-0,118	(0,077)					-0,121	(0,080)
Job Loss S1(*)	-0,912 ***	(0,292)	-1,113 ***	(0,368)	-0,476	(0,465)		
Job Loss S2(**)	-0,150	(0,224)	-0,407	(0,278)	0,397	(0,371)		
Job Loss S3(***)	-0,319	(0,182)	-0,323	(0,211)	-0,332	(0,360)		
Long Participation (****)	-0,053	(0,051)	-0,030	(0,062)	-0,100	(0,088)	-0,147 ***	(0,053)
Job Loss (S1)*Age (>50=1)							-1,110	(0,616)
Job Loss (S1)*Children							-0,563	(0,880)
Job Loss (S1)*High Education							-0,096	(0,681)
Job Loss (S1)*Main Earner (T-3)							0,269	(0,747)
	N=5.977		N=4.696		N=1.281		N=5.578	
	Wald chi2(9)=		Wald chi2(8)=		Wald chi2(8)=		Wald chi2(9)=	
	3.635,19****		2.960,72****		679,98****		3.285,92****	
	Rho=0,2918		Rho=0,2918		Rho=0,3151		Rho=0,2949	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP

(*) T>S3>T-1 (**) T-1>S2>T-2 (***) T-2>S1>T-3 (****) More than 4 waves participating in GSOEP

**p<.05, ***p<.01, ****p<.001

Model B.1: All sample. Model B.2: West-Germany.

Model B.3: East-Germany. Model B.4: All sample-Interaction effects

TABLE 32. MODEL C: RANDOM EFFECTS ESTIMATIONS. YEARS: 1984-2001. MEN.

EFFECT OF REEMPLOYMENT ON CHANGE IN HEALTH SATISFACTION.								
	MODEL C.1		MODEL C.2		MODEL C.3		MODEL C.4	
			West-Germany		East-Germany			
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	4,011 ****	(0,432)	4,085 ****	(0,508)	4,156 ****	(0,888)	3,327 ****	(0,265)
H. Satisf. T-1	-0,566 ****	(0,030)	-0,562 ****	(0,034)	-0,663 ****	(0,063)	-0,554 ****	(0,029)
Change HH Inc. (<0=1)	-0,158	(0,135)	0,000	(0,000)	0,000	(0,000)	0,000 **	(0,000)
Age T-1	-0,013	(0,007)	-0,017	(0,009)	-0,010	(0,012)		
No German=1	-0,089	(0,204)	-0,058	(0,223)	-2,116	(1,100)	-0,090	(0,192)
East German=1	-0,132	(0,201)						
High Educated=1	-0,064	(0,190)	-0,065	(0,218)	0,071	(0,448)	-0,110	(0,189)
Reemployment S(*)	0,603 ****	(0,166)	0,516 **	(0,216)	0,665 **	(0,270)		
Long Participation (**)	-0,352 **	(0,177)	-0,314	(0,194)	-0,954 **	(0,461)	-0,415 **	(0,177)
Reemployment*Age (>50=1)							0,197	(0,232)
Reemployment*Children							0,266	(0,274)
Reemployment*East German							0,300	(0,264)
Reemployment*>24m.unemp.							0,490	(0,297)
	N=940		N=671		N=269		N=940	
	Wald chi2(8)=		Wald chi2(7)=		Wald chi2(7)=		Wald chi2(9)=	
	385,35****		273,69****		133,51****		377,09****	
	Rho=0,2815		Rho=0,3411		Rho=0,1676		Rho=0,2937	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP

(*) T>S>T-1   (**) More than 4 waves participating in GSOEP

**p<.05, ***p<.01, ****p<.001

Model B.1: All sample. Model B.2: West-Germany.

Model B.3: East-Germany. Model B.4: All sample-Interaction effects

TABLE 33. MODEL C: RANDOM EFFECTS ESTIMATIONS. YEARS: 1984-2001. WOMEN.

	EFFECT OF REEMPLOYMENT ON CHANGE IN HEALTH SATISFACTION.							
	MODEL C.1		MODEL C.2 West-Germany		MODEL C.3 East-Germany		MODEL C.4	
	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors	Coeff.	St.Errors
Cons.	5,122 ****	(0,473)	4,586 ****	(0,661)	5,682 ****	(0,675)	3,008 ****	(0,253)
H. Satisf. T-1	-0,651 ****	(0,032)	-0,594 ****	(0,048)	-0,706 ****	(0,042)	-0,607 ****	(0,031)
Change HH Inc. (<0=1)	0,086	(0,129)	0,000	(0,000)	0,000	(0,000)	0,000	(0,000)
Age T-1	-0,042 ****	(0,007)	-0,036 ***	(0,011)	-0,048 ****	(0,010)		
No German=1	0,298	(0,226)	0,233	(0,239)	0,526	(0,627)	0,330	(0,214)
East German=1	-0,095	(0,191)						
High Educated=1	0,471 **	(0,197)	0,407	(0,245)	0,531	(0,330)	0,549 ***	(0,200)
Reemployment S(*)	0,532 ****	(0,146)	0,636 **	(0,261)	0,519 ***	(0,177)		
Long Participation (**)	0,342 **	(0,166)	0,678 **	(0,288)	0,127	(0,201)	0,183	(0,170)
Reemployment*Age (>50=1)							-0,177	(0,317)
Reemployment*Children							0,547 **	(0,238)
Reemployment*East German							0,121	(0,244)
Reemployment*>24m.unemp.							0,344	(0,276)
	N=860 Wald chi2(8)= 443,88**** Rho=0,3537		N=344 Wald chi2(7)= 164,62**** Rho=0,2566		N=516 Wald chi2(7)= 294,78**** Rho=0,4201		N=860 Wald chi2(9)= 389,09**** Rho=0,3748	

Dependent Variable: Change in Health Statisfaction between the periods t-1 and t   Source: GSOEP
(*) T>S>T-1   (**) More than 4 waves participating in GSOEP
**p<.05, ***p<.01, ****p<.001
Model B.1: All sample. Model B.2: West-Germany.
Model B.3: East-Germany. Model B.4: All sample-Interaction effects

SUMMARY AND CONCLUSIONS

As we pointed out in the introduction, unemployment and especially long-term unemployment have become one of the main concerns of the German government.

One of the proposes of the government in order to motivate job search is to reduce the maximal duration of the period to which individuals have the right to receive unemployment subsidy.

Behind this proposal there is the believe that there is a voluntary component in unemployment. Or in other words, there is the believe that some unemployed remain longer unemployed because they don't feel the pressure to find another job due to the *generous* financial support of the state.

However, not all unemployed remain voluntarily in unemployment. For many individuals (especially for older ones) unemployment is a situation from which it is difficult to come out and for whom the chances of reemployment decrease as the period of unemployment increases.

Under this unfavourable situation some individuals may suffer serious consequences. Unemployment may cause health problems to those persons who can not accommodate to their situation. Typically, there is a loss of self-esteem due to the impossibility of changing a situation with which the individual (and his/her family) is not satisfied.

In the present study we have analysed the health situation of unemployed. The main objective has been to analyse how health changes after job loss and how health develops as the length of the unemployment spell increases.

In the first chapter we reviewed the models proposed by Warr and Jahoda to explain how (un)employment affects health.

Jahoda's functional model explains the negative effect of unemployment by arguing that unemployed are deprived from some latent functions (a part from the financial remuneration) which are linked to employment.

Warr's vitamin model argues that the environment in which individuals are involved suffer a deterioration after job loss and this is what explains the negative effect of unemployment on health.

Warr accounts in his theory for different effects of unemployment for different groups while Jahoda doesn't. Furthermore, Warr also accounts for the possibility of a positive effect after loosing a dissatisfying job while Jahoda doesn't.

Next, we reviewed recent studies which analyse the effect of unemployment on health and well-being. These studies were classified into review studies, cross-sectional studies and longitudinal studies.

The distinction between cross-sectional and longitudinal studies was carried out in order to point out the main methodological problem in the analysis of the relationship between unemployment and health: the endogenous relationship between these two variables.

This endogeneity can derive from two sources:

- From the reverse causality between unemployment and health. Unemployment may affect health and at the same time, individuals with poor health may have more probabilities of becoming unemployed.

- From unobserved factors (for the analyst) that may affect both the likelihood of job loss and health status.

Longitudinal data solves better the problem of endogeneity. First, because with longitudinal data we can identify the right temporal sequence of events in order to isolate the direction of causality object of analysis.

Second, with panel data we can control for the non-observable factors by introducing into the equation an individual effect (constant trough time). Furthermore, with the use of the right estimation method it is possible to overcome the problem of correlation between this individual effects and other explanatory variables.

Most of the reviewed studies (cross-sectional and longitudinal) showed evidence of a negative effect of unemployment on health.

In the same chapter, we reviewed recent studies which analyse whether or not individuals who lose their job get used to their situation. In the reviewed studies there is evidence of adaptation and also evidence of no-adaptation. This question has been also tested in the empirical analysis carried out in the fourth chapter and which results will be summarised below.

In the second chapter, we analysed the health indicator used to test the empirical relationship between unemployment and health: health satisfaction.

Health satisfaction is a subjective health indicator which was already introduced in the first wave of the GSOEP. Individuals answer to the question *how satisfied are you with your health?* and rate their answer in a scale which goes from 0 to 10 (being 0 completely unsatisfied and 10 completely satisfied).

We reviewed the advantages of using subjective health indicators versus objective health indicators.

The main advantage of the subjective health indicators is that they are global indicators of a person's perception of health, which include not only physical aspects but also psychological and social aspects.

Another aspect which makes subjective health indicators more attractive than objective health indicators is that they are easier to collect.

In this chapter, we also reviewed recent studies which analyse the validity of subjective health indicators. These studies analyse the association between subjective health indicators and objective health indicators.

The majority of the reviewed studies showed that there is a close relationship between subjective health indicators and other health outcomes.

Finally, we applied the health report model developed by Kerkhofs and Lindeboom in order to analyse health response behaviour using GSOEP data.

The objective was to analyse whether or not unemployed tend to report lower levels of health satisfaction even controlling for objective health measures and other exogenous variables. Or in other words, to see whether or not unemployment causes miss-reporting.

After a multivariate analysis with GSOEP data of the year 2002 we concluded that unemployment does have an effect on health reporting. After controlling for objective health and the standard exogenous variables, unemployment still had an effect on health satisfaction.

Unemployed tend to report lower levels of health satisfaction. One plausible explanation for this result is that unemployed need to justify (themselves and the society) their inactivity by reporting lower levels of health. Being ill is socially more accepted than being inactive.

In this first step we concluded that unemployed tend to report lower levels of health satisfaction. Next, in a second step, we analysed whether or not unemployed already reported lower levels of health satisfaction even before job loss.

In the multivariate analysis we controlled for future unemployment (and objective health measures), and we observed that individuals who were going to suffer unemployment in the following periods already showed evidence of miss-reporting.

The bias introduced by miss-reporting was eliminated in the empirical analysis of the relationship between unemployment and health satisfaction (fourth chapter) by considering health changes.

Since unemployed are consistent in their miss-reporting behaviour trough time, by analysing changes in health satisfaction the miss-reporting bias is removed from the analysis.

In the third chapter, we reviewed the health production function framework. These models offer a framework trough which the relationship between health inputs and outputs can be tested.

Until the 60s the studies which analysed the relationship between health inputs and health outputs did not consider a global health production function which includes all main health inputs. They only considered the health inputs which wanted to analyse.

By the end of the 60s, Auster et al. developed a more complete health production function in order to analyse what has a bigger contribution on a person's health: medical services, environmental factors, or changes in the health population.

At the beginning of the 70s Grossman developed the so-called Human Capital Model of the Demand for Health. The objective of Grossman was to develop a framework with which it is possible to analyse how individuals allocate their resources to produce health.

Health is seen as a durable capital stock which output is healthy time. Each individual has an initial amount of health capital which is depreciated with the time and which can be increased by investment.

Health is demanded first because it enters directly in the utility function (is a consumption commodity), and second because it is an investment commodity which determines the total amount of healthy time.

Rosenzweig and Schult developed a model at the beginning of the 80s which has have a big influence in following empirical studies.

The authors distinguish between endogenous and exogenous health inputs. Endogenous inputs are themselves choices, and exogenous inputs can be considered in the health production function as given.

Due to the fact that individuals can take decisions about diverse health inputs (like smoking, eating breakfast,...) according to factors which are not observable for the researcher, in the analysis of the production of health it must be considered a behavioural model in which health inputs are themselves choices.

Kenkel, in 1995 developed a household health production function where the stock of health depends on the individual's stock of schooling capital, some standard exogenous variables and the individual's lifestyle.

For Kenkel every individual decides his own lifestyle taking into account that he/she derives utility from the desired lifestyle, and that the lifestyle choice affects his/her health stock.

Cantoyannis and Jones, following the same idea developed in 2001 a model of lifestyle and health production which they estimate simultaneously.

After having reviewed the main theoretical models concerning health production, in the fourth chapter the relationship between unemployment and health was analysed empirically.

Due to the endogenous relationship between these two variables, we didn't analyse how unemployment (and other inputs) in t affect health in t. We analysed how health satisfaction changes between two points in time when the individual suffers job loss between these two points in time.

Data from the first 18 waves of the German Socio-Economic Panel was used for this analysis.

First, the main variables of the analysis: health satisfaction and labour force status were described in detail.

Next, a first descriptive analysis of the relationship between labour force status and health satisfaction was carried out. We observed that employed are better off in terms of health satisfaction than individuals who are not employed (unemployed or out of the labour force).

However, we don't know whether employment has an effect on health, or whether healthy people have more probabilities to be employed.

In order to point out the reverse causality between the two variables, we analysed the relationship between health satisfaction in t-1 and labour status in t, concluding that health satisfaction may also have an influence on labour status.

To overcome the problem of the double direction of the relationship, we made use of the longitudinal structure of the GSOEP. The possibility of observing individuals at different points in time, allowed us to identify the sequence in which the events occur.

We analysed how health satisfaction changes as the labour status changes between t-1 and t. We did not find evidence of a negative effect of job loss on health satisfaction changes.

Next, we considered longer periods of unemployment and we analysed how health satisfaction changes as the period of unemployment increases. We observed no evidence of a negative effect of short time unemployment (less than one year) on health satisfaction. However, after the first year of unemployment there is an increase in the

percentage of individuals reporting negative health satisfaction changes. The percentage of negative changes decreases after the second year of unemployment, showing evidence of adaptation.

Summarising, the main conclusions of the descriptive analysis were that employed are better off than unemployed in terms of health satisfaction and that the effect of unemployment on health varies as the period of unemployment increases.

Therefore, in the multivariate analysis, we analysed the effect of unemployment on health, paying special attention to the distinction between short and long term unemployment.

As we pointed out above, due to the longitudinal structure of the GSOEP, we are able to observe health satisfaction before and after job loss. Therefore, the objective of the multivariate analysis was to see how health changes when an individual loses his job in comparison to individuals who remain employed.

We estimated three different models. In the first model (Model A), the period between t-1 and t was considered. We selected individuals who were employed in t-1. From these individuals some remained employed till t and others lost their job at some point of time between t-1 and t and then remained unemployed till t. Other possible events were not considered.

We compared how health satisfaction of individuals who lost their job changed between t-1 and t in relation to individuals who remain employed the whole period.

In the second model (Model B) we considered a longer period (between t-3 and t). We selected individuals who were employed in t-3. From these individuals some remained employed the whole period (till t). Others lost their job between t-3 and t-2 and remained unemployed till t. Others lost their job between t-2 and t-1 and remained unemployed till t. And finally, other subgroup lost their job between t-1 and t and remained unemployed till t. Other possible events were not considered.

In this second model we tested the different effects on health satisfaction changes, from losing job and remaining unemployed for more than two years, for more than one year or less than one year, in relation to remaining employed the whole period.

Finally, in the third model (Model C), again the period between t-1 and t was considered. However, in this case, we selected individuals who were unemployed in t-1. From these individuals some remained unemployed the whole period and other found a job.

We analysed whether or not there was a significant difference in health satisfaction changes between individuals who remained unemployed and individuals who found a job in this period.

We estimated these three models separately for men and women, since in the descriptive analysis we already found some differences between men and women in the effect of unemployment on health satisfaction.

Furthermore, for every sub-sample 4 different sub-models were considered. The first one includes all the (sub-)sample, the second and the third one were estimated separately for East- and West-Germany and in the fourth sub-model different interaction effects were introduced.

Only individuals with ages between 21 and 65 were considered.

We first estimated the models using OLS with pooled data and then we carried out random effects estimations.

From the results obtained from the estimation of the models A and B, we first concluded that short term unemployment (less than one year) has only a significant (and negative) effect for men, while for women, short-time unemployment does not have a significant effect on health satisfaction changes.

The interpretation for this result is that most women who are employed are at the same time responsible for house tasks and for children supervision. Or in other words, women are usually doubly employed. Therefore, a first reaction after job loss may be of relief.

On the other hand, in men's life, work plays usually a very important role, and leave other tasks like house tasks or children education in women's hands. Therefore, the first reaction after job loss may be of great disappointment.

For women who stay in the labour market even two years after job loss, unemployment has a significant and negative effect.

After the first *impact* of job loss men show evidence of adaptation since there is no significant effect on health satisfaction changes from being more than one year (and less than two) unemployed.

However, being unemployed more than two years has a significant and negative effect on health satisfaction changes.

Summarising, short term unemployment has a significant effect only for men, and being more than two years unemployed has a significant and negative effect for both men and women.

The exception are men living in East-Germany. For this sub-sample short term unemployment has no significant effect. One possible explanation for this result are the high unemployment rates existing in this part of Germany. Clark argues that the impact of own unemployment may be attenuated by unemployment of the relevant others.

From the estimation of the models with interaction effects, we concluded that age acts as an stressor of the negative effect of unemployment. Individuals older than 50 suffer a bigger impact. This may be due to the lack of perspectives of the older unemployed in a labour market which is orientated to the young ones. Older unemployed have less chances to find another job than younger unemployed. Taking a look at the statistics, more than the half of the German firms don't hire older individuals[233].

From the estimation of the third model (model C), we concluded that reemployment has a significant and positive effect on health satisfaction changes for both unemployed men and women.

In this model we controlled for the duration of unemployment, and we concluded that the positive effect of reemployment does not depend from how long individuals have been unemployed.

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[233] Leber, U. (2001) Ältere – ein Schatz muss gehoben werden. *IAB Materialen*. Informationdienst des Instituts für Arbeitsmarkt- und Berufsforschung der Bundesanstalt für Arbeit. Ausgabe Nr. 2.

FURTHER RESEARCH QUESTIONS

In this study we have analysed how own unemployment affects health. Furthermore, we introduced in the models A and B an interaction term in which job loss was interacted with the labour status of the partner.

However, this interaction term was for men and women insignificant, with the exception of the estimation of the model A for women. In this case, the interaction effect was significant, however the sign of the coefficient was not the expected one: positive. In other words, the fact that the partner was unemployed or out of the labour force at the moment in which the individual lost his/her job moderated the effect of unemployment.

The interrelations between the labour force status of different members of a family and their effects on health is an interesting topic to which it must be paid attention. The effect of unemployment may be stressed or moderated by the labour force status of other family members.

We already introduced Clark's argument, for whom the effect of own unemployment is moderated by unemployment of the relevant ones (in this case, members of the same family).

There is not only interrelation between the labour force status of different members of a family but also between other health inputs. Therefore, a challenging research topic is the analysis of how health inputs and outputs of different members of the same family interact.

Usually, most empirical and theoretical studies examine the relationship between health inputs and outputs of an individual. However, it may be argued that the interaction between different family members may have an effect on health investment decisions of the individuals.

It is reasonable to think that the utility of the individuals increases not only with their own health but also with the health status of other members of the family. Even if it wasn't like this, let's say that individuals have egoistic preferences, there are certain effects on the budget constraint from living in a family which may affect the investment decisions of the family members.

Some recent theoretical works have considered these aspects. Jacobson[234] extended the Grossman model for the family context. Each member of the family is producer not only of his own health but also of the health of the other family members.

In Grossman's model, individuals invest in health because they derive utility from health (consumption benefits) and furthermore because by investing in health, the time available for market and nonmarket activities will be increased (investment benefits).

In Jacobson's model, individuals also derive consumption and investment benefits from investing in other family members' health. The healthier the family is, the higher is the total working time of all the members and therefore the higher will be the total household income. At the same time it is reasonable to think that the individual derives utility not only from his health but also from the health status of the other members of the family.

Jacobson, in her model, considers that the family members have common preferences, or in other words, that the family maximises a joint family utility function.

Although it is an interesting framework, it does not allow the analysis of the implications of observing different preferences within the same family.

These kind of models have been usually qualified as 'single utility framework' or 'traditional approach'. Bourgignon and Chiappori[235] argue that this traditional approach has some shortcomings.

First, they ignore the basic rule of the neo-classical micro-economic analysis which is individualism. This principle requires each individual to be represented by his preferences.

And second, the traditional approach just ignores the processes of intrahousehold allocation.

Another assumption of the single unitary model which has been sistematically rejected is the 'income pooling' assumption. The idea is that the source of household income has no effect on final allocations.

Due to these shortcomings, a collective model in which individual preferences are considered, is more desirable that a single utility framework in order to analyse interaction in the production function.

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[234] Jacobson L. (2000) The family as producer of health- an extended grossman model. *Journal of Health Economics* 19; 611-637.
[235] Bourguignon F. and Chiappori P-A. (1992) Collective models of household behaviour. An introduction. *European Economic Review* 36: 355-364.

In a collective model, we consider individual preferences, and these preferences must be defined. How does each individual care about the other? One possibility is that the individuals have egoistic preferences. In thi case, all goods are consumed privately.

Other possibility is that the individuals have altruistic preferences then, all the consumptions of both members, enter both member's utility function.

Egoistic and altruistic preferences are the extreme cases. There is an intermediate solution, which is caring preferences. In this case, each members maximizes a welfare index that depends on both his own egoistic preferences and the other member's egoistic preferences.

After defining the preferences, the next step is to define the assumptions made on the decission process. The decission process between the members, can be cooperative and non-cooperative. The procedure is cooperative if only Pareto outcomes can be reached. In a non-cooperative framework, the process is described as a game between the individuals. One class of cooperative models that has been used in several studies is Nash bargaining.

Bolin et al. [236,237,238] in a model developed recently, use individual utility functions for the different members of the family, allowing for conflicting preferences between the different members of the family. Under their point of view, the possibility of divorce and the fact that health capital is not shared between the spouses in case of divorce has an influence in the investment decisions in good health of the spouses.

Although the model developed by Bolin et al. offers a very interesting theoretical framework, it is very difficult to test it empirically.

Chiappori [239,240] and Chiappori et al.[241] developed recently a collective model of household labour supply which offers a very interesting theoretical framework, and furthermore it is testable empirically.

They believe that intrahousehold bargaining has a significant impact on the behaviour of the family members and therefore, it must be taken into account.

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[236] Bolin K., Jacobsson L. and Lindgren B. (2001) The family as health producer – The case when family members are Nash-bargainers. *Journal of Health Economics*. vol. 20, Issue 3: 349-362.
[237] Bolin K., Jacobsson L. and Lindgren B. (2002) The family as health producer – when spouses act strategically. *Journal of Health Economics*. vol. 21, Issue 3: 475-495.
[238] Bolin K., Jacobsson L. and Lindgren B. (2002) Employer investments in employee health. Implications for the family as health producer. *Journal of Health Economics*. vol. 21, Issue 4: 563-583.
[239] Chiappori, P-A. (1992) Collective Labor supply and welfare. *Journal of Political Economy* vol.100, no.3:437-467.
[240] Chiappori, P-A. (1997) Introducing household production in collective models of labor supply. *Journal of Political Economy* vol.105, no.1:191-209.
[241] Chiappori, P-A., Fortin, B. and Lacroix, G. (2002) Marriage market, divorce legislation, and household labor supply. *Journal of Political Economy* vol.110, no.1:37-71.

The maximisation problem of the family can be split into two steps. In the first step, income is allocated between the members of the family and then, each member separately derives his demand function taking the *new* budget into account.

Although this framework has been originally developed in order to analyse household labour supply, their attractive characteristics motivate an adaptation of this collective framework in order to analyse the interrelations between the health demand functions and health production functions of the members of the family.

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