Why Are the Unemployed So Unhappy?
Evidence from Panel Data

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This paper tests for the importance of non-pecuniary costs of unemployment using a longitudinal data-set on life-satisfaction of working-age men in Germany. We show that unemployment has a large detrimental effect on satisfaction after individual specific fixed effects are controlled for. The non-pecuniary effect is much larger than the effect that stems from the associated loss of income.

Introduction

The growing concern about the extent of joblessness in advanced Western economies is fuelled by the perception that the social costs of unemployment substantially exceed the costs of an economy operating below its potential. Rather, it is suspected that unemployment imposes an additional burden on the individual, a burden that might be referred to as the non-pecuniary cost of unemployment. Those costs arise primarily since employment is not only a source of income but also a provider of social relationships, identity in society and individual self-esteem. Darity and Goldsmith (1996) provide a summary of the psychological literature on the link between loss of employment and reduced wellbeing.

Substantial efforts have been made in the past to quantify these non-pecuniary costs of unemployment. (See Junankar 1987; Bjorklund and Eriksson 1995 and Darity and Goldsmith 1996 for surveys of previous empirical studies.) To begin with, one can think of costs directly in terms of decreased psychological wellbeing. Beyond that, decreased wellbeing may express itself through adverse individual outcomes such as increased mortality, suicide risk and crime rates, or decreased marital stability. These possibilities have been explored by previous research. The general finding is that unemployment is associated with substantial negative non-pecuniary effects (see e.g. Jensen and Smith 1990; Junankar 1991).

The case seems particularly strong for the direct negative association between unemployment and psychological wellbeing. For instance, Clark and Oswald (1994), using the first wave of the British Household Panel Survey, report estimates from ordered probit models in which a mental distress score is regressed on a set of individual characteristics, unemployment being one of them. They find that the effect of unemployment is both statistically significant and large: being unemployed increases mental distress by more than does suffering impaired health. Other researchers have used different measures of psychological wellbeing and yet obtained the same basic result, a large negative effect of unemployment on well being. Bjorklund (1985) and Korpi (1997) construct wellbeing indicators from symptoms of sleeplessness, stomach pain, depression and the like, while Goldsmith *et al*. (1995, 1996) measure

psychological wellbeing through responses that establish the individual's 'locus of control'. Closest to our study in terms of dependent variable is Blanchflower (1996), who studies the effect of unemployment on a life-satisfaction response in data from 23 countries.

However, Blanchflower (1996) as well as most other cited studies, is based on cross-section data and hence is subject to the usual limitations associated with such data. Where panel data have been used, data-sets were small and are based on narrowly defined sub-populations (e.g. those aged 16–24 in Korpi 1996). By presenting evidence from a large representative panel data-set, we address two types of concern typically associated with the use of cross-sectional data. First, it is difficult to infer the direction of causation—does unemployment lead to low satisfaction, or is it the other way around? Assume, for instance, that inherently dissatisfied persons are more likely to be laid off; in a cross-section study, this effect would be falsely interpreted as an effect of unemployment on satisfaction. Second, the presence of unobserved common determinants of satisfaction and unemployment may lead to a spurious correlation, or omitted variable bias. Health is one such factor that is commonly difficult to measure correctly. With repeated observations for the same individuals, it becomes possible to control for unobserved, but time-invariant, individual specific effects that are correlated with unemployment.

Our main result is that the detrimental effect of unemployment persists after individual specific fixed effects are accounted for. We also shed some light on the causality issue. While panel data do not always solve the problem of causation, we present various types of evidence suggesting that unemployment in fact causes dissatisfaction. Furthermore, the richness of our data-set allows us to explore two additional issues that have been hitherto largely neglected.

First, we analyse the empirical content of the distinction between non-participation and unemployment. Labour economists typically acknowledge that the boundary between unemployment and non-participation is not well defined. Added- and discouraged-worker hypotheses have been invoked to capture the grey area between the two states. Flinn and Heckman (1983) answer the question 'Are unemployment and out-of-the-labour force behaviourally distinct labour force states?' in the affirmative. Our analysis largely confirms their conclusion.

Second, we decompose the cost of unemployment into direct (pecuniary) costs through reduced income and indirect (non-pecuniary) costs through reduced wellbeing. Technically, this is achieved by estimating the effect of unemployment for a given income, *ceteris paribus*. We find that the pecuniary costs are small compared with the non-pecuniary costs.

The paper is organized as follows. In Section I we introduce the data from the German Socio-Economic Panel and discuss some modelling issues. Section II analyses basic patterns of satisfaction and labour force status. Formal fixed effects regression models for satisfaction responses are introduced in Section III, while Section IV contains the results of our analysis.

I. The Data

Our empirical analysis of the determinants of individuals' psychological wellbeing is based on the response to the question

> How satisfied are you at present with your life as a whole?

which is given on an ordinal scale from 0 to 10, where 0 means 'completely dissatisfied' and 10 means 'completely satisfied'. A question of this type is frequently included in general purpose household surveys. Examples are the British Household Panel Survey (Buck *et al.* 1994) or the International Social Survey Programme (Blanchflower 1996). Here, we use data for West Germany before reunification drawn from the German Socio-Economic Panel (GSOEP: see Wagner *et al.* 1993) in order to

1. test whether unemployed individuals are satisfied or dissatisfied relative to individuals out of the labour force and employed individuals, and
2. establish the size of the non-pecuniary costs of unemployment relative to the pecuniary costs.

While such subjective variables (which measure what people say rather than what they do) have usually been treated with suspicion by economists, they have been used occasionally in the past. Freeman (1978) and Ackerlof *et al.* (1988) are examples for studies using job satisfaction, while Easterlin (1974, 1995) and Blanchflower (1996) are examples of studies based on life satisfaction responses. The measurement issues are the same for job and life satisfaction. A particular concern is that individuals 'anchor' their scale at different levels, rendering interpersonal comparisons of responses meaningless. This problem bears a close resemblance to the issue of cardinal versus ordinal utility. Any statistic that is calculated from a cross-section of individuals, for instance an average satisfaction, requires cardinality of the measurement scale.

It is clear that, from a statistical perspective, this problem is closely related to the problem of unobserved individual specific effects. Hence, anchoring causes the estimator to be biased as long as it is not random but correlated with explanatory variables. Panel data help if the metric used by individuals is time-invariant. The important benefit of panel data is that such data allow us to make inferences based on *intra*- rather than *inter*personal comparisons of satisfaction. Of course, the limitation to intra-individual variation avoids not only potential biases caused by anchoring, but also biases caused by other unobserved individual specific factors.

The data we use come from the first six (1984–90) waves of the GSOEP and provide repeated measurements on satisfaction as well as various socio-economic and demographic characteristics for a pool of (initially) about 10,000 individuals. The information on satisfaction and labour market status refers to the time of the survey. In contrast to standard international practice, unemployment is defined not by a search criterion but rather by registration in the official unemployment register. The survey contains some limited recall information on events that occurred between interview periods. For example, individuals fill out a monthly calendar on labour force status; this calendar information can be used to construct the length of the current unemployment episode for those who are unemployed.[1] Moreover, individuals who terminated an employment contract during the past year are asked for the reasons of termination. We use these responses to construct an index of voluntary and involuntary unemployment.

The analysis is for a sample of male individuals aged 20–64 at the time of the interview. We exclude women from the analysis since we expect significant differences in the ways in which labour market events affect female satisfaction,

and a detailed analysis of those is beyond the scope of this paper.[2] After deleting records with missing values, we obtain a sample with a total of 20,944 observations. We do not require a balanced panel and hence allow the number of individuals to vary from year to year. The number of individuals in a given year is determined by two factors. First, the age limitations will result in young individuals entering the sample once they become 20 and in old individuals leaving once they turn 64. Second, general panel attrition reduces the number of respondents over time. Not surprisingly, the second effect dominates the first and, as a consequence, the sample size decreases from 4183 persons in 1984 to 3080 persons in 1989. We are not too worried about this attrition, since all regressions are based on unbalanced panel designs. Moreover, we find that the sample composition in terms of labour market status, health and other socio-demographic characteristics hardly changes over time. To be on the safe side, we report results from a separate analysis of a subsample that uses the first three years only and faces a lesser attrition problem.

II. Satisfaction and Labour Force Status

We start with an analysis of some simple descriptive statistics. Figure 1 displays the relative frequencies of the answers to the satisfaction question for the year 1984. The frequency distribution is skewed to the right with a mean response of 7·4 and a modal response of 8. The middle response 5 exhibits a local mode, which might reflect a focal choice for those individuals who perceive themselves as neither particularly satisfied nor particularly dissatisfied. Accordingly, we classify individuals with responses 4 or below as having 'low' satisfaction, or
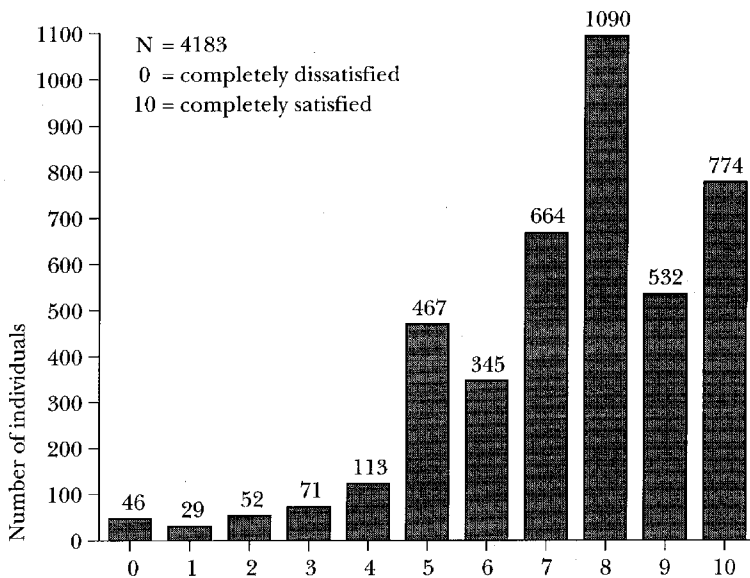

FIGURE 1. Life satisfaction in Germany (FRG), 1984, $N = 4183$; $0 =$ completely dissatisfied; $10 =$ completely satisfied.

Source: German Socio-Economic Panel (see text).

being 'dissatisfied'. The proportion of individuals with low satisfaction in the 1984 wave is 7·4%. The first row of Table 1 shows that average satisfaction slightly drops (from 7·4 to 7·1) during the six-year period 1984–89, while the proportion of individuals with low satisfaction shows no marked trend.

TABLE 1

AVERAGE LIFE SATISFACTION AND PROPORTION OF INDIVIDUALS WITH LOW SATISFACTION, 1984–1989[a]

	1984	1985	1986	1987	1988	1989
All						
Mean	7·435	7·231	7·284	7·184	7·085	7·124
	(0·032)	(0·033)	(0·032)	(0·032)	(0·032)	(0·033)
% dissatisfied	7·4	8·0	7·0	7·3	8·2	7·8
	(0·004)	(0·004)	(0·004)	(0·004)	(0·005)	(0·005)
N	4183	3658	3416	3410	3197	3080
Employed						
Mean	7·638	7·422	7·459	7·317	7·224	7·251
	(0·032)	(0·033)	(0·033)	(0·032)	(0·033)	(0·033)
% dissatisfied	5·0	5·5	4·8	5·5	6·4	6·0
	(0·004)	(0·004)	(0·004)	(0·004)	(0·005)	(0·005)
N	3530	3043	2856	2858	2661	2563
Out of labour force						
Mean	6·688	6·890	6·839	6·873	6·663	6·717
	(0·119)	(0·110)	(0·110)	(0·109)	(0·113)	(0·112)
% dissatisfied	17·5	11·5	13·0	11·1	13·8	13·5
	(0·018)	(0·016)	(0·017)	(0·016)	(0·019)	(0·017)
N	445	382	385	370	347	392
Unemployed						
Mean	5·587	5·296	5·406	5·725	5·899	5·792
	(0·197)	(0·173)	(0·176)	(0·184)	(0·169)	(0·229)
% dissatisfied	27·4	34·8	29·1	28·6	23·3	25·6
	(0·031)	(0·031)	(0·034)	(0·034)	(0·031)	(0·039)
N	208	233	175	182	189	125
Employed with unemployment experience						
Mean	7·286	7·112	6·898	6·931	6·985	6·928
	(0·143)	(0·142)	(0·138)	(0·137)	(0·137)	(0·132)
% disssatisfied	7·7	8·3	11·1	6·9	7·5	6·3
	(0·017)	(0·019)	(0·021)	(0·017)	(0·019)	(0·017)
N	248	206	226	218	200	207

[a] Standard errors in parentheses.

To approach the question of how changes in individual satisfaction are related to labour market status, Table 1 gives the mean satisfaction and the proportion of individuals with low satisfaction by current labour market status for a given year. The labour force states are Employment (which includes full-time and part-time employment and excludes self-employment), Unemployed and Out of labour force. The following pattern emerges: Employment is associated with the highest (though falling) average satisfaction levels in all the years. On a scale from 0 to 10, the satisfaction of individuals out of the labour force is roughly half a unit below that of the employed. The difference is statistically significant. Unemployed have a satisfaction that is between 1·5 and 2 points below the typical satisfaction level of an employed. This effect is highly significant and large.

Comparing the percentage of individuals with low satisfaction for the various labour market states, we find that between 5% and 6% of the employed,

11% and 18% of the non-participants and 23% and 35% of the unemployed report a low satisfaction. In other words, a randomly selected jobless person is much more likely to have a low satisfaction than a randomly selected employed person. This effect is pronounced for the non-participant, but is much stronger still for the unemployed. The overall evidence suggests that:

1. a persistent satisfaction gap for the unemployed exists, confirming the results from previous research using different data sources, and
2. it is 'joblessness' that matters, not just unemployment; however, the adverse effect of unemployment is much stronger than the effect of non-participation.

Next, we consider the argument that unemployed individuals are inherently dissatisfied. We provide two types of evidence. First, we report in Table 1 the satisfaction levels for the subset of individuals who are currently employed but were unemployed in at least one of the other years. Second, we cross-tabulate in Table 2 changes in satisfaction with changes in employment status.

TABLE 2
CHANGE IN SATISFACTION BY LABOUR FORCE STATUS IN $t-1$ AND t

	Labour force status in t		
Labour force status in $t-1$	Employed	Unemployed	Out of labour force
Employed			
Mean	−0·104	−1·192	−0·403
s.e.	0·021	0·192	0·199
N	12,544	312	255
Unemployed			
Mean	1·124	−0·062	0·342
s.e.	0·197	0·185	0·332
N	274	395	105
Out of labour force			
Mean	0·620	−0·525	−0·018
s.e.	0·255	0·471	0·088
N	129	61	1205

In Table 1 we find that employees with past unemployment experience have in fact a lower satisfaction than the average employee and hence might be intrinsically dissatisfied. Another explanation for their lower satisfaction is that these individuals have insecure jobs and that their satisfaction is reduced by fear of potential job losses. Whatever the cause, the effect is small compared with the drop experienced by individuals who actually become unemployed. For instance, the average satisfaction of individuals who later become unemployed is 7·3 in 1984, compared with an average satisfaction of 7·6 of all employed; the average satisfaction of the unemployed, however, is 5·6. As a preliminary conclusion, unemployed individuals are to some extent dissatisfied before becoming unemployed, but this effect is small compared with the drop in satisfaction while actually unemployed.

Table 2 gives corroborating evidence. It shows by how much the average satisfaction responds to changes in labour force status. For instance, changing

from paid employment to unemployment is associated with a drop in satisfaction of -1.19. Conversely, the satisfaction of those who were unemployed in the last period and become re-employed increases by 1.12—the effects are symmetric, and are also highly significant, with standard errors of about 0.2. This is further evidence against the hypothesis that unemployed individuals are those who were already dissatisfied.

As expected, a significant negative effect is also detected for the transition from employment to out of labour force. However, the effect is about half the size of the unemployment effect. Interestingly, status changes between unemployment and out of labour force lead to insignificant changes in satisfaction, although the point estimates indicate a lower satisfaction for the unemployed. Finally, we notice that Table 2 records little variation in satisfaction for those who do not change their labour force status. This result indicates that individuals do not get used to their situation—the satisfaction of the unemployed does not improve as they stay unemployed for a second consecutive period.

While we find strong evidence that changes from employment to joblessness are associated with decreased satisfaction (for the same individual) we can still not be sure that this represents a causal relationship. It is a possibility that unemployment is endogenous and is chosen by the individual. For instance, a worker may become dissatisfied with his job and hence decide to become voluntarily unemployed. If this is true, dissatisfaction causes unemployment rather than the opposite.

To distinguish between the effects of exogenous and endogenous changes in unemployment, Table 3 presents two types of evidence. First, we measure the effect of unemployment separately for different age groups. Our assumption is that unemployment is more likely to be endogenous for younger workers who have no established careers as yet; older workers, in contrast, are more likely to become unemployed through (exogenous) plant closures and layoffs. Second, we use information that is available for part of the unemployed to distinguish between voluntary and involuntary employment terminations.[3] We are mostly interested in determining whether or not the detrimental effect of unemployment persists for workers with exogenous unemployment, that is older workers and workers with involuntary terminations. Table 3 show that this is in fact the case. Both older and the involuntarily unemployed experience

TABLE 3

Change in Satisfaction for Transition from Employment to Unemployment for Selected Subgroups

	Mean	s.e.	N
Age			
Under 29	-1.239	0.403	71
30–49	-1.304	0.288	145
50 and over	-0.990	0.343	96
Reason for termination[a]			
Voluntary	-0.890	0.300	113
Involuntary	-1.401	0.267	161

[a]Observations do not add up to $N = 312$ owing to non-responses.

substantial and significant reductions in satisfaction. Moreover, we cannot reject the hypothesis that the detrimental effect of unemployment is the same independently of age or reason for termination.[4] The results are consistent with the interpretation that unemployment can be treated as exogenous, and hence causal, for satisfaction.

In the following, we refine the analysis by distinguishing between two main channels through which unemployment may cause a decrease in satisfaction. First, unemployment is associated with an income loss, the size of which depends on various factors such as previous income, family status, unemployment duration and the like. For Germany, estimates of this income loss range from 40% to 50% of the pre-unemployment income. Second, unemployment creates non-pecuniary costs since it deprives the individual of the social rewards of employment.

To assess the relative magnitude of these two potential channels, we turn to a multiple regression analysis, where we control for the pecuniary aspects using a measure of (the log of) household income that includes all types of government transfers and is net of taxes—that is, disposable income. Our main interest is to test whether or not there is a specific negative effect of unemployment on wellbeing after controlling for the associated income loss, other observed variables and unobserved fixed effects, and how this effect compares with the effect of non-participation.

III. ECONOMETRIC SPECIFICATION

Satisfaction is measured on an ordinal scale, and hence ordered probit or logit models would be the appropriate econometric techniques (Greene 1993). Such models have been used in Clark and Oswald (1994) and in Blanchflower (1996). However, no ready formulation of the model is available for the fixed-effects case. We propose to collapse the satisfaction variable into a satisfied/dissatisfied dichotomy. While the binary variable approach does not use the available information efficiently, it enables us to make use of a relatively well developed class of limited dependent variable panel models. Furthermore, it can be shown that the resulting binary logit estimator is consistent, a result that does not depend on the choice of the breaking point (Crouchley 1995). In particular, we consider the following underlying latent model:

$$(1) \qquad S_{it}^* = \alpha_i + x_{it}'\beta + \varepsilon_{it}, \qquad i = 1, \ldots, N, t = 1, \ldots, T,$$

where S_{it}^* is a continuous but unobserved index of satisfaction of individual i in period t, x_{it} is a vector of explanatory variables, and α_i is an idiosyncratic fixed effect which accounts for inter-individual differences in scaling and anchoring of the responses, intrinsic differences in satisfaction and unobserved explanatory variables, as long as these differences are constant over time. Rather than observing S_{it}^*, we observe

$$(2) \qquad Sa_{it} = \begin{cases} 1 & \text{if } S_{it}^* > 0 \\ 0 & \text{otherwise.} \end{cases}$$

For ε_{it} independently logistic,

$$(3) \qquad P(S_{it} = 1 \,|\, x_{it}, \alpha_i) = \frac{\exp(\alpha_i + x'_{it}\beta)}{1 + \exp(\alpha_i + x'_{it}\beta)}.$$

Chamberlain (1980, 1984) shows that such a fixed-effects logit model can be estimated by conditional maximum likelihood. In particular, the probability of a particular sequence $(S_{i1}, \ldots, S_{iT})$, conditional $s_i = \sum_{t=1}^{T} S_{it}$,

$$(4) \qquad P(S_{it}, \ldots, S_{iT} \,|\, x_{i1}, \ldots, x_{iT}, \alpha_i, s_i) = \frac{\prod\limits_{t=1}^{T} \exp(x'_{it}\beta S_{it})}{\sum\limits_{d \in D_i} \prod\limits_{t=1}^{T} \exp(x'_{it}\beta d_t)}$$

where D_i is the set of all possible combinations of s_i ones and $T - s_i$ zeros, is independent of α_i. In order to test for fixed individual effect, one can perform a Hausman-type test based on the difference between the above conditional MLE and the usual logit MLE ignoring the individual effects (where the constant is dropped to compute the statistic). The test-statistic

$$(5) \qquad H = (\hat{\beta}_{\mathrm{CML}} - \hat{\beta}_{\mathrm{ML}})'(\hat{V}_{\mathrm{CML}} - \hat{V}_{\mathrm{ML}})^{-1}(\hat{\beta}_{\mathrm{CML}} - \hat{\beta}_{\mathrm{ML}})$$

is asymptotically χ^2 distributed with k degrees of freedom.[5]

Explanatory variables

The set of explanatory variables x includes a set of dummy variables indicating current labour market status (*UNEMPLOYED*, *OUT OF LABOUR FORCE*) with *EMPLOYED* as reference category. We further control for good health condition (*GOOD HEALTH*, defined as the absence of any chronic condition or handicap), *AGE* and *AGE-SQUARED*, and marital status (*MARRIED*).

Unemployment reduces income which in turn may reduce satisfaction. However, if income is included as a control variable, the unemployment coefficient in fact measures the specific (non-pecuniary) effect of unemployment *ceteris paribus*, that is keeping income constant. It is not obvious what the right income measure would be. If individuals are not indifferent as to who earns income within the household, individual income might be more relevant than household income. Unfortunately, the GSOEP measures individual income as either wage income in the previous month or average total income in the previous year. Neither measure is suitable for the present analysis and hence we use household income, which is total income at the time of the interview.[6]

We further control for the length of the current unemployment spell (*DURATION*). The importance of the duration of unemployment on the mental state of the individual is well documented in the psychological literature. For instance, Harrison (1976) distinguishes the sequential stages of shock–optimism–pessimism–fatalism during a period of unemployment. On the other hand, Easterlin (1974) suggests that individuals get used to everything in the long run, so that unemployment should hurt more in the short run. The overall direction of the effect is an empirical question.[7] To allow for potential nonlinearities, we also included the squared unemployment duration (*DURATION-SQUARED*).

Finally, we consider age-specific differences in the effect of labour force status on psychological wellbeing. Clark and Oswald (1994) find that there is a U-shaped relationship between the psychological damage of unemployment and age with a minimum mental wellbeing for those aged 30–49. They point out that young people may worry less about unemployment because they recognize that it happens more to people like them. Also, young people may perceive unemployment as a transitory experience associated with labour market entry. Technically, we report estimates for regressions with age–labour force interaction terms.

IV. Results

Table 4 gives logit estimates for five different models. Model 1 is the standard logit regression for data that are pooled over time; model 2 is the fixed effects logit model. For both models, the dependent variable is coded as 1 if the original satisfaction response is above 7 and as 0 otherwise. Since average satisfaction is between 7 and 8, this is equivalent to classifying individuals into those who report above- and those who report below-average satisfaction. Models 3 and 4 explore the robustness of the fixed effects logit results under modified specifications. First, model 3 re-estimates model 2 for the shorter period 1984–86 in order to assess the potential effects of sample attrition. Second, model 4 re-estimates model 2 under a different classification for the dependent variable. Here, the dependent variable is 1 if the satisfaction response falls into the (5–10) range. Finally, model 5 introduces age-specific effects of unemployment and out of labour force.[8]

When looking at the regression results, one has to keep in mind that the fixed effects estimator does not use information provided by inter-individual comparisons of satisfaction responses. As a consequence, the satisfaction effect is identified by individuals who change labour force and satisfaction status during the period. In fact, in the fixed effects logit model all individuals with unchanged outcome drop out of the conditional likelihood function. In our sample, we observe 2523 individuals who change their binary satisfaction status at least once during the 1986–89 period. This number drops to 1634 for the shorter subperiod in model 3, and to 925 in model 4, where the alternative break-point is used. Furthermore, it is apparent from Table 2 that there are 586 changes between employment and unemployment, 384 changes between employment and out of labour force and 166 changes between unemployment and out of labour force.[9] Hence the number of informative observations is substantially lower than the total sample size, and the superior properties of the fixed effects estimators in terms of bias have to be traded off for less precise estimates, i.e. higher standard errors, which is clearly seen in Table 4.

A comparison between the fixed effects and pooled logit models leads to the following conclusions. First, the fixed effect model is the better model. The Hausman test statistic of 213·4 leads to a rejection of the model without fixed effects.[10] Second, the substantive conclusion with respect to the detrimental effect of unemployment on satisfaction persists after fixed effects are taken into account. If anything, the effect of unemployment slightly increases in absolute value, from 0·89 to 0·96.

TABLE 4

LOGIT REGRESSION RESULTS FOR BINARY SATISFACTION VARIABLE:
FIVE MODELS

	Pooled (1)	With fixed effects			
		(2)	(3)	(4)	(5)
Constant	−0·548 (0·315)				
UNEMPLOYED	−0·892 (0·145)	−0·958 (0·204)	−0·900 (0·362)	−1·174 (0·236)	
UNEMPLOYED × age ≤ 29					−1·121 (0·252)
UNEMPLOYED × 29 < age < 49					−0·923 (0·254)
UNEMPLOYED × age ≥ 50					−0·718 (0·289)
OUT OF LABOUR FORCE	−0·401 (0·053)	−0·244 (0·123)	−0·494 (0·216)	−0·549 (0·168)	
OUT OF LABOUR FORCE × age ≤ 29					−0·392 (0·201)
OUT OF LABOUR FORCE × 29 < age < 49					−0·682 (0·265)
OUT OF LABOUR FORCE × age ≥ 50					0·052 0·174)
DURATION (of unemployment)	−0·016 (0·013)	−0·008 (0·017)	−0·035 (0·043)	−0·017 (0·018)	−0·009 (0·017)
DURATION-SQUARED ∗ 10^{-1}	−0·000 (0·002)	0·000 (0·002)	0·000 (0·001)	0·002 (0·002)	0·001 (0·002)
MARRIED	0·285 (0·038)	0·666 (0·119)	0·665 (0·225)	0·746 (0·194)	0·666 (0·119)
GOOD HEALTH	0·641 (0·034)	0·341 (0·058)	0·279 (0·090)	0·500 (0·099)	0·342 (0·058)
AGE	−0·098 (0·010)	−0·118 (0·037)	−0·154 (0·082)	−0·049 (0·066)	−0·112 (0·037)
AGE-SQUARED ∗ 10^{-1}	0·012 (0·001)	−0·001 (0·004)	−0·013 (0·091)	−0·003 (0·007)	−0·002 (0·004)
log Household income	0·230 (0·029)	0·130 (0·056)	0·165 (0·097)	0·320 (0·098)	0·129 (0·056)
log-likelihood	−13,344	−4589	−1650	−1572	−4627
Hausman test (degrees of freedom)		213·4(7)			

Notes
No. of observations: 20,944.
Dependent variable: 1 if satisfied, 0 if dissatisfied.
Models 1, 2, 3, and 5: dissatisfied if satisfaction response is 7 or below on the 0–10 scale.
Model 4: dissatisfied if satisfaction response is 4 or below on the 0–10 scale.
Models 1, 2, 4, and 5: 1984–89.
Model 3: 1984–86.

    The effect of unemployment is large—almost three times larger than the effect of bad health. The out of labour force (OLF) coefficient is negative and significant as well; however, it is smaller, and the hypothesis that unemployment and OLF have the same effect on satisfaction can be rejected at any

conventional significance level. Based on the fixed effects results, and in contrast to Clark and Oswald (1994), we do not find that satisfaction is U-shaped in age. The squared term is insignificant, and we find an inverse relationship between age and satisfaction. Furthermore, we find that for those who are unemployed satisfaction is unrelated to unemployment duration; hence there is no evidence that the long-term unemployed get used to their situation and partially recover from the initial adverse effect. Finally, the estimated effect of income is positive and statistically significant although small.

One has to be careful about making quantitative statements since the coefficients do not correspond to marginal effects. In order to illustrate the magnitude of the estimated income coefficient, one can consider 'compensating income variations', i.e. the relative increase in income that is needed to compensate an individual for the drop in satisfaction resulting from unemployment. If a 100% increase of income raises happiness by β_{inc} and unemployment decreases satisfaction by β_{ue}, then income needs to be increased by β_{ue}/β_{inc} in order to make up for lost satisfaction resulting from unemployment. Based on the fixed effects logit income estimate of 0·13, the compensating variation is roughly 7. This number suggests that income would need to be increased tremendously in order to trigger an increase in satisfaction large enough to just offset the adverse effect of unemployment. Moreover, it also suggests that the pecuniary costs of unemployment are relatively small. If we assume an unemployment-induced income reduction of 50%, the estimated pecuniary costs of unemployment of $-0·13*0·5$ fall substantially short of the non-pecuniary cost of $-0·96$.

How robust are these results? When we restrict the sample to the years 1984–86, the estimated coefficients are largely unchanged, although, as expected, standard errors are larger in the model that uses fewer observations. This suggests that attrition is not a particular problem. The only notable change is an increase in absolute magnitude for out of labour force. One possible explanation is an age composition effect. In particular, we find that the shorter 1984–86 data-set has a lower proportion of older individuals among the unemployed and the non-participants. Since we find in the following that older individuals are relatively less effected by non-participation, the observed increase in the OLF estimate may result. The substantive conclusions from model 2 are also upheld by model 4, where the satisfaction response is split around 5 rather than 7, in order to generate the binary dependent variable. Most coefficients increase in absolute value but, again, unemployment is the single most important factor increasing the probability of dissatisfaction. The effects are generally estimated less precisely than by model 2, since the dependent variable has less variation.

The hypothesis that labour force status effects are age-specific is investigated in model 5, the last column of Table 4. We define three age groups (under 30, 30–49 and over 49) and include interaction terms into the fixed effects regressions. The results show that the impact of unemployment and non-participation in fact varies substantially with age. A likelihood ratio test shows that model 5 is superior to model 2 ($LR = 124·12$ with 4 degrees of freedom). Substantively, we find that unemployment has the largest effect for the young and becomes gradually smaller. Hence our findings differ from those

by Clark and Oswald (1994), who find that the effect of unemployment is largest for those aged 30–49.

Substantial differential effects emerge for non-participation: the effect of OLF is insignificant for those aged 50 or over. These findings point towards the importance of the social environment in determining the psychological effects of joblessness—those who chose early retirement are not negatively affected at all. For prime-aged men, in contrast, non-participation has a large negative impact of −0·68, although this is still smaller than the effect of unemployment for this age group (−0·92).

The major result of this study is that the use of panel data and fixed effects models corroborates previous cross-section evidence of a large negative effect of unemployment on satisfaction. The point estimates on unemployment are very similar for the pooled and panel models. The use of cross-sectional data appears to be most misleading for assessing the effect of marital status and health. For these two variables, pooled and fixed effects estimates differ substantially. The health effect drops by about 50%, while the marriage effect more than doubles, once fixed effects are introduced. One possible inference is that health is positively (and marriage negatively) correlated with 'intrinsic satisfaction', and hence with the individual specific fixed effects.

V. Conclusions

Using data on life satisfaction for 1984–89 from the German Socio-Economic Panel, we perform an analysis of the determinants of satisfaction. We find that, after controlling for various observed individual characteristics and exploiting the panel structure of the data by allowing for individual specific fixed effects, unemployment has a significant and substantial negative impact on satisfaction. The non-pecuniary costs of unemployment by far exceed the pecuniary costs associated with loss of income while unemployed. For men aged 30–49, we find that being out of labour force also has large adverse effects, although of smaller order of magnitude.

Why does this matter? First, an inclusion of non-pecuniary costs of unemployment is essential when one is to conduct a cost–benefit analysis of employment generating policies. Second, taking into account the psychological cost of unemployment may provide a promising starting point when thinking about hysteresis and duration dependence of unemployment. This line of reasoning has been recently promoted by Darity and Goldsmith (1996), who argue that the adverse psychological affects of unemployment may change tastes for work and search strategies, as well as lowering productivity.

NOTES

1. No direct information on the spell length is available.
2. Clark and Oswald (1994) report higher mental distress scores for women, while Blanchflower (1996) reports higher satisfaction levels.
3. Respondents were classified as being unemployed involuntarily if they encountered one of the following situations: trouble with supervisor; business rationalization; bankruptcy.
4. We would not expect to see a negative effect for the voluntarily unemployed. One possibility is that 'voluntary' has turned into 'involuntary' unemployment by the time of the interview.
5. We did not pursue the alternative random effects specification that is available for the probit model, since the required assumption of independence between the individual effect and the regressors is implausible in the current context.
6. The exact question is: 'If everything is taken together, how high is the total monthly income of all the household members at present? Please give the net monthly amount, in other words after the deduction of tax and national insurance contributions. Regular payments such as rent subsidy, child benefit, government grants, subsistence allowances, etc., should be included.'
7. Note that the sample is biased towards longer unemployment spells; if those people are dissatisfied, the degree of dissatisfaction for the unemployed will be upward-biased.
8. The reported regressions are estimated without time effects. Time dummies lead to identification problems in the fixed effects models. In the pooled model, the inclusion of time dummies has almost no effect on the remaining coefficients.
9. The changes are relatively evenly distributed over the years (ranging from 22% for 1984–85 to 19% for 1988–89). Most changes between employment and unemployment occur for those persons aged 30–49 (45% of all changes), while changes involving non-participation are more frequent for those aged 50 or older (48% of all changes for both employment and unemployment).
10. Under H_0, the statistic is approximately chi-squared distributed with 9 degrees of freedom.

REFERENCES

AKERLOF, G. A., ROSE, A. K. and YELLEN, J. L. (1988). Job switching and job satisfaction in the US labor market. *Brookings Papers on Economic Activity*, **2**, 495–582.

BLANCHFLOWER, D. G. (1996). Youth labor markets in twenty three countries: a comparison using micro data. In D. Stern (ed.), *School to Work Policies and Practices in Thirteen Countries*. Cresskill: Hampton Press.

BJÖRKLUND, A. (1985). Unemployment and mental health: some evidence from panel data. *Journal of Human Resources*, **10**, 469–83.

—— and ERIKSSON, T. (1995). Unemployment and mental health: evidence from research in Nordic countries. University of Aarhus Centre for Labour Market and Social Research, Working Paper no. 95–12.

BUCK, N., GERSHUNY, J., ROSE, D. and SCOTT, J. (1994). *Changing Households: The BHPS 1990 to 1992*. Wivenhoe Park, Essex: ESCR Research Centre on Micro-Social Change.

CHAMBERLAIN, G. (1980). Analysis of covariance with qualitative data. *Review of Economic Studies*, **47**, 225–38.

—— (1984). Panel data. In Z. Griliches and M. D. Intriligator (eds.), *Handbook of Econometrics*, Vol. II. Amsterdam: North-Holland.

CLARK, A. E. and OSWALD, A. J. (1994). Unhappiness and unemployment. *Economic Journal*, **104**, 648–59.

CROUCHLEY, R. (1995). A random-effects model for ordered categorical data. *Journal of the American Statistical Association*, **90**, 489–98.

DARITY, W. Jr. and GOLDSMITH, A. H. (1996). Social psychology, unemployment, and macroeconomics. *Journal of Economic Perspective*, **10**, 121–40.

EASTERLIN, R. A. (1974). Does economic growth improve the human lot? Some empirical evidence. In P. A. David and M. W. Reder (eds.), *Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz*. New York and London: Academic Press.

—— (1995). Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior and Organization*, **27**, 35–48.

FLINN, C. J. and HECKMAN, J. J. (1983). Are unemployment and out of the labor force behaviorally distinct labor force states? *Journal of Labor Economics*, **1**, 28–42.

FREEMAN, R. B. (1978). Job satisfaction as an economic variable. *American Economic Review*, **58**, 135–41.

GOLDSMITH, A. H., VEUM, J. R., and DARITY, W. Jr. (1995). Are being unemployed and being out of the labor force distinct states? A psychological approach. *Journal of Economic Psychology*, **16**, 275–95.

——, —— and —— (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.

GREENE, W. H. (1993). *Econometric Analysis*. New York: Macmillan.

HARRISON, R. (1976). The demoralising experience of prolonged unemployment. *Department of Employment Gazette*, **84**, 339–48.

HSIAO, C. (1986). *Analysis of Panel Data*. Cambridge: Cambridge University Press.

JENSEN, P. and SMITH, N. (1990). Unemployment and marital dissolution. *Journal of Population Economics*, **3,** 215–29.

JUNANKAR, P. N. (1987). *Social Costs of Unemployment*. Luxembourg: Commission of the European Communities.

—— (1991). Unemployment and mortality in England and Wales: a preliminary analysis. *Oxford Economic Papers*, **43,** 305–20.

KORPI, T. (1997). Is utility related to employment status? Unemployment, labor market policies and the psychological well-being of youth. *Labour Economics*, **4,** 125–46.

WAGNER, G. G., BURKHAUSER, R. V. and BEHRINGER, F. (1993). The English Language public use file of the German socio-economic panel. *Journal of Human Resources*, **28,** 429–33.