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SCARRING: THE PSYCHOLOGICAL IMPACT OF PAST UNEMPLOYMENT

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Abstract

This paper provides some of the first empirical evidence on the psychological impact of past unemployment. Using eleven waves of the German socio-economic panel (GSOEP) data set, we show, as is now standard, that those currently unemployed have far lower life satisfaction scores than do the currently employed. We also show that, over the whole sample, well-being is lower the greater has been the past experience of unemployment. In this sense, unemployment scars. However, an interaction term between current and past unemployment attracts a positive coefficient. This suggests a habituation effect whereby the negative well-being effect of unemployment is much lower for those who have been unemployed more often in the past. We also use the panel aspect of our data to present some evidence that those who suffer greater falls in well-being on entering unemployment are less likely to remain unemployed one year later. Together these findings offer a psychological explanation of persistent unemployment.

JEL Classification: D10, J28, J63.

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SCARRING: THE PSYCHOLOGICAL IMPACT OF PAST UNEMPLOYMENT

“How I wish I could forget those happy yesteryears, that have left a rosary of tears”

(Eubie Blake *Memories of You*)

1. Introduction

There is a large literature in economics dealing with the effects of job loss on individuals. This literature has analysed carefully the determinants of the duration of unemployment and the wages of the job that the unemployed receive in future positions, with special attention being placed on those who enter unemployment involuntarily (Jacobson *et al.*, 1993, and Ruhm, 1991). Less attention has been paid to the psychological effects of past unemployment. Recent research has concentrated largely on contemporaneous correlations between labour force status and measures of satisfaction, happiness or well-being. What has been less well explained is whether certain groups are hurt less by unemployment, and whether the psychological harm from unemployment persists.

Two relatively unexplored ideas are tested in this paper, using individual panel data from the German Socio-Economic Panel (GSOEP). The first is that past unemployment reduces the current well-being of individuals, whether they are presently employed or unemployed: in short, we test if past unemployment “scars”. The second is that if individuals are unemployed for some time, they may become used to it: we refer to this as “habituation”. The latter hypothesis is closely related to the notion of “hysteresis” in the labour market. Individuals may dislike unemployment, and the memory of a previous spell is a spur to avoid another one, but if unemployment becomes the norm for an individual, then there is a reduced incentive to try to change one’s labour force status. We argue below that both ideas are supported by the data, and that there is therefore an intimate link between proxy, subjective

measures of utility, and “hard” data on observable behaviour, such as the duration of unemployment.

The paper is structured as follows: section 2 briefly reviews some of the key literature, section 3 describes the data and methodology, and section 4 presents the main empirical results. Section 5 tests the robustness of the main results and examines a number of related issues, and section 6 concludes.

2. Previous Literature

The link between unemployment and subjective measures of well-being has received increasing attention from economists recently. One result that has become standard across different data sets and countries is that unemployment is associated with lower levels of satisfaction or well-being. Fryer and Payne (1986) is a review of earlier work. More recently, reviewing empirical evidence and data in many industrialised countries, Oswald (1997, p. 1828) concludes that:

“A consistent theme through the paper’s different forms of evidence has been the vulnerability of human beings to joblessness. Unemployment appears to be the primary economic source of unhappiness.”

Other recent examples include Clark and Oswald (1994) and Theodossiou (1998) from wave one of the British Household Panel Survey (BHPS), Whelan *et al.* (1998) comparing British and Irish data, Gerlach and Stephan (1996) and Winkelmann and Winkelmann (1998), both of which use the GSOEP, Di Tella *et al.* (1998), who use a vast array of repeated cross-sectional data from the Eurobarometer surveys, Clark (1996), using data on twelve different countries from the 1991 International Social Survey Program data set, Björklund and Eriksson (1998) for research using Scandinavian data, Korpi (1997) for survey results among Swedish youths,

Woittiez and Theeuwes (1998) for Dutch results, and Namazie and Sanfey (1998) for a transition economy, Kyrgyzstan. Agerbo *et al.* (1997) is notable in that it uses panel data to show that unemployment is a strong predictor of first entries into psychiatric hospitals.

What has received much less attention is whether unemployment has different psychological effects on different groups of people. One question of interest is whether, loosely speaking, unemployment hurts less the more there is of it around. A start on this question has been made with cross-section data. Clark and Oswald (1994) and Clark (1998) both show that the psychological impact of unemployment is lower in high unemployment regions. In addition, Clark (1998) demonstrates that this impact is also lower when the individual's partner is unemployed or, more generally, when there is another unemployed person in the same household.¹

Here we want to address an old question in economics and psychology: do you get used to something the more of it you have had in the past? That is, instead of the stigma of unemployment depending on comparison with others, does an individual's own experience of unemployment in the past temper their current experience of their labour market status? In Heckman and Borjas' (1980) terms, this idea is consistent with their notion of lagged duration dependence. The psychological basis for this hypothesis is that judgements of current situations depend on the experience of similar situations in the past, and that higher levels of past consumption or experience may offset higher current levels (see Kahneman, 1994). This hypothesis is mostly advanced with respect to "goods". Here we look at the effects of a "bad" - unemployment - which seems to lower an individual's utility much more than the associated

¹ This may provide an alternative reason to the standard "benefits trap" argument to explain why so many households in Britain (about 20 per cent, according to Gregg and Wadsworth, 1996) have nobody in employment.

drop in income would imply (see Clark and Oswald, 1994, and Winkelmann and Winkelmann, 1998).

This analysis of persistent psychological effects of past unemployment complements earlier work that provided objective statistical evidence on the duration dependence of unemployment and on the “discouraged worker” effect. An early example using longitudinal data is Schweitzer and Smith (1974), who show that past unemployment has a significant negative effect on current labour force participation decisions. Another is Heckman and Borjas (1980). More recently, Arulampalam *et al.* (1998) use the first five waves of the BHPS to show strong evidence of state dependence of unemployment for males. As these authors and others note, the existence of such scarring effects highlights the need for active labour market policies to help the long-term unemployed, as such policies have the potential to reduce the equilibrium rate of unemployment.

Our work has some parallels with Akerlof and Yellen (1985), where the rate of “remembered” unemployment is compared to that recorded in the Current Population Survey. The ratio of the two is considered as an index of the “salience” or painfulness of unemployment: the smaller the percentage of CPS unemployment that is remembered one year later, the less painful that unemployment was. Akerlof and Yellen show that this salience index fell from 1960 to 1981 in the US, and that some groups, such as younger and older workers, have lower salience indices than do others. However, the authors do not relate salience to the individual’s past experience of unemployment, which is the approach taken here.

The paper most closely related to ours is Winkelmann and Winkelmann (1998), and we extend their analysis in a number of ways. First, we use more waves of the GSOEP and we include females in our analysis. Second, and more importantly, we carry out more extensive

tests of the scarring and habituation hypotheses. Although Winkelmann and Winkelmann (1998, p.6) note that:

“employees with past unemployment experience have in fact a lower satisfaction than the average employee”,

this correlation is not tested formally in their econometric specifications. In addition, duration effects are insignificant in their life satisfaction regressions, leading the authors to claim that, in our terminology, there is no evidence of habituation. As we shall argue below, this result depends on the measure used. In this paper, rather than considering the duration of the current spell, we calculate the individual’s total exposure to unemployment over the past three years. Using this broader measure, we show that there is in fact strong evidence that the psychological impact of unemployment is lower for those who have experienced more unemployment in the past.

3. Methodology and Data

The empirical work in this paper is based on data from the first eleven waves of the West German sub-sample of the GSOEP, spanning the period 1984-1994.² Focusing on those respondents who were between 25 and 55 years of age in 1984 yields 16959 and 20563 person-year observations of male and female respondents respectively.

The measure of past unemployment used here is the number of months of unemployment, divided by the number of months active in the labour force, over the past three years. The exclusion of those for whom the past three-year unemployment rate cannot be calculated results in an unbalanced panel of 11228 person-year observations for males and

² For a description of the GSOEP see Wagner *et al.* (1993).

13791 person-year observations for females³. In this sample, we have 520 observations on unemployed males and 477 observations on unemployed females, yielding average unemployment rates over the 1987-1994 period of about 4.6% and 5.8% respectively.⁴

Using the above sample we estimate models of the effect of current and past three-years unemployment on life satisfaction. The well-being function that we consider has the general form:

$$W_i = W(ue_i, ue_i^*, \dots). \quad (1)$$

In this paper, W_i is given by responses to a question on life satisfaction, on a scale of zero to ten. The variable ue_i is the individual's current unemployment status. The many studies cited above have calculated the partial correlation between W_i and ue_i . The innovation of the current paper is to add a measure of past unemployment to the welfare function of "reference group" unemployment, ue_i^* , to which, we argue, the individual compares his or her own current unemployment status.⁵

Before turning to the econometric estimation, Tables 1 and 2 contain a first look at the data, showing the distribution of life satisfaction for both males and females (Table 1) and

³ It has long been known that unemployment is not equally distributed amongst the population. Intertemporally, one way of seeing this is that the same people tend to repeat spells of unemployment. As a result of this heterogeneity, past unemployment is often a good predictor of future unemployment (Heckman and Borjas, 1980, Arulampalam *et al.*, 1998). In our data, past three-years unemployment and current unemployment are not too highly correlated (0.60 for males and 0.61 for females). This is one of the arguments that led us to take past unemployment experience over a three-year period, rather than a shorter time frame. The main results are, however, robust to past unemployment being measured over shorter and longer periods.

⁴ This is self-reported unemployment rather than being defined by benefit receipt.

⁵ Clark (1999) shows that job satisfaction depends negatively on wages received in the past, consistent with intertemporal comparisons. An alternative hypothesis, not explored in this paper, is that individuals compare to others like themselves or to others in the same household (Clark, 1998, estimates well-being functions of this form; Clark and Oswald, 1996, estimate job satisfaction functions where wages are compared to the wages of "others like you").

then the means of life satisfaction among different groups. The distributions in Table 1 are very similar for males and females: the modal class for both is a score of eight, and more than five per cent give the maximum score of ten.

The first panel of Table 2 shows that, for both males and females, life satisfaction is significantly higher for the employed than for the unemployed. Those who are currently unemployed have a past three-years unemployment rate of about fifty per cent, compared to less than two per cent for those who are currently employed. Table 2 also presents some preliminary evidence of scarring among those with different employment status. For males, life satisfaction is greater for those who have suffered less than average unemployment in the past. For females, the picture is slightly different. Amongst those who are currently employed, life satisfaction is higher the less they have been unemployed in the past three years (as for males) but for those who are unemployed, those who have suffered more than average unemployment in the past are actually happier than those with less than average unemployment, although this difference is not significant at conventional significance levels. This is our first tentative evidence of habituation.

For the rest of the paper we focus on the results of econometric estimation. The main equation that we estimate is the empirical counterpart of equation (1):

$$S_{it} = \beta_0 + \beta_1 UN_{it} + \beta_2 PASTUN_{it} + \beta_3 (UN_{it} \times PASTUN_{it}) + X_{it}'\gamma + u_{it}, \quad (2)$$

where S_{it} is life satisfaction reported at t , UN_{it} is a dummy variable with value 1 if respondent is unemployed at time t and 0 otherwise, $PASTUN_{it}$ is past unemployment between $t - j$ and $t - 1$ measured as a percentage of total time active in the labour market, X_{it} is a vector of individual and other characteristics affecting life satisfaction, and u_{it} is the error term. Our main results are based on a specification that focuses on a three-year past unemployment ($j = 3$). As S_{it} is measured as an ordinal categorical variable on a scale from

0 to 10, we estimate (2) using the ordered probit model developed by Aitchison and Silvey (1957) and McKelvey and Zavoina (1975).

The estimation of (2) allows us to test the following three hypotheses of interest:

- (i) the currently unemployed report lower life satisfaction scores than those in full-time salaried work;
- (ii) past unemployment reduces the current well-being of those who are currently in employment, that is, past unemployment scars;
- (iii) the effect of current unemployment on well-being is smaller for those who have been unemployed more often in the past, consistent with a habituation effect.

Hypothesis (i) implies $\beta_1 < 0$; hypothesis (ii) implies $\beta_2 < 0$; and hypothesis (iii) implies $\beta_3 > 0$.⁶

4. Main Results

The main results from ordered probit estimations are shown in Table 3. Focusing on males first, column (1), our baseline specification, shows that, consistent with evidence in Winkelmann and Winkelmann (1998), those currently unemployed report lower life satisfaction than those in full-time salaried employment. A similar pattern is observed for females, and both results are very robust to different model specifications.

⁶ More precisely, $\beta_1 < 0$ means that, holding other variables constant, the presence of unemployment shifts the probability distribution to the left, raising the probability of being in the lowest satisfaction category ($S = 0$) and reducing the probability of the highest category ($S = 10$). Equivalently, the cumulative probability $P(S \leq X)$ for $X \leq 9$ increases. The effect on the probability of being in any other single satisfaction category cannot be inferred solely from the sign of the coefficient. This interpretation applies to all of the regression coefficients.

Other results from Table 3 largely conform to prior expectation and/or previous research by other authors: household income is positive and significant for both males and females (individual income is not recorded for those not working in the GSOEP, so we control for household income). Part-time as opposed to full-time employment is weakly correlated with lower life satisfaction for men and higher life satisfaction for women. Interestingly, being out of the labour force has a negative effect on reported satisfaction for males, whereas it has a positive effect for females. Self-employed men are less satisfied than men in full-time salaried work, and age has the familiar inverse-U shape effect on satisfaction (see Clark *et al.*, 1996), minimising at around age 42. More years of education increase life satisfaction. Disability, not surprisingly, has a negative effect, while married individuals and home-owners report higher life satisfaction scores.

The second column in each panel tests our “scarring” hypothesis, by introducing the past unemployment term. The hypothesis is supported convincingly for males: those who experienced higher unemployment rates over the past three years, as a proportion of their total time active in the labour market, report lower satisfaction scores. Thus, past unemployment scars men. The evidence of scarring for females is weaker (see column 5).⁷

Columns (3) and (6) investigate the possibility of habituation by including the interaction term between current and past unemployment. This interaction term attracts a positive coefficient for both men and women, showing that current unemployment “hurts” less

⁷ Note that this scarring effect is independent of the current level of income, which has been the main focus of the existing economics literature, as income is controlled for in our multivariate analysis. One possibility is that jobs following on from spells of unemployment are worse in ways that we cannot measure in the GSOEP. This idea is similar to that expressed in Darity and Goldsmith (1996), that previous unemployment “reduces the quality of workforce history embedded in the labour force” (p.132). Another possibility is that past unemployment is correlated with current job insecurity, leading to lower life satisfaction.

for those who have experienced more unemployment in the past.⁸ The addition of this interaction term results in the coefficient on past unemployment in the female regression becoming significant, providing evidence of scarring for females.

The same pattern of results is thus observed for both men and women in columns (3) and (6) respectively: current and past unemployment both reduce life satisfaction, but the negative effect of current unemployment is smaller for those who have higher values of past unemployment. The estimated coefficients on all of the unemployment variables are less well-defined (in the sense of having smaller t-statistics) for women than for men, although all are significant at the 1% level or better. All of these results are very robust to the exclusion of Table 3's current and past household income variables.

One striking way of putting this habituation result is that, controlling for other relevant factors, an unemployed man who has been unemployed for approximately 60 per cent of his active months in the labour market over the past three years is currently indifferent between employment and unemployment ($-0.347 + 0.578 \times 0.60 = 0$).⁹ For women however, the effect of unemployment on life satisfaction is always negative, even if they have been unemployed for all of the previous three years. An alternative way to think of this result for males is to take a "representative" individual, calculate the probability of recording a given level of satisfaction (say $S \geq 8$) based on the coefficients of the regression, and then see how this probability varies as labour force status changes. For example, a 35-year old man, with 18 years of education who is married with one child, with mean current and past income, a

⁸ A similar type of effect has recently been found by Agerbo *et al.* (1997): in Danish panel data, there is some evidence that the currently unemployed who have been less exposed to unemployment in the past are more likely to enter a psychiatric institution.

⁹ However, a forward-looking unemployed man in this position however would recognise that, by accepting a job now, he will gradually reduce his value of the past unemployment variable, which raises future life satisfaction and would therefore not be indifferent between taking a job and remaining unemployed.

homeowner living in Berlin, has the following predicted probabilities of reporting life satisfaction of 8 or higher, on the 0 to 10 scale, depending on his values of past and current unemployment:

- (i) Employed, past three-years unemployment rate = 0%: $P(\text{satisfaction} \geq 8) = 53.09\%$
- (ii) Employed, past three-years unemployment rate = 60%: $P(\text{satisfaction} \geq 8) = 33.56\%$
- (iii) Unemployed, past three-years unemployment rate = 0%: $P(\text{satisfaction} \geq 8) = 39.39\%$
- (iv) Unemployed, past three-years unemployment rate = 60%: $P(\text{satisfaction} \geq 8) = 33.56\%$

Evidently, the value of the past unemployment rate variable was not chosen at random here: with a past three-years unemployment rate of 60%, this man has the same predicted probability of having high life satisfaction whether he is employed or unemployed.

5. Further Results

In this section we test the robustness of the results reported above and examine a number of related issues. First, it is of interest to check whether the scarring and hysteresis hypotheses hold more strongly for certain groups of individuals than for others. To test this, we augment the model in Table 3 by including interaction terms of the past unemployment variables with education, age and the presence of children.

The results of these experiments are summarised in Table 4. The numbers in column (1) show that education affects the habituation term for males, habituation being significant only for those with low educational attainment. In column (2) there is some evidence that the habituation term disappears for young male workers, and in column (3) we find, perhaps not surprisingly, no evidence of a habituation effect for unemployed men with children present.

The results for women are somewhat different from those for men. Column (4) shows that both the scarring and the habituation effects of past unemployment are only found for women with higher educational attainment, and column (5) reveals no evidence of significant age interactions for women. Last, column (6) shows, as for men, no habituation effect when there are children present, and some evidence of a reduced scarring effect for women with children.

A second issue that has attracted attention in the labour economics literature is whether unemployment and economic inactivity are distinct labour market states. Here we provide some new evidence, by seeing whether past unemployment and past inactivity affect an individual's current well-being in different ways. Table 5's results show that, for men, past inactivity reduces well-being, as did past unemployment in Table 3. The impact of past inactivity is weaker, and there is some evidence of a habituation effect. For women, however, we find that past inactivity does not scar but that the well-being of those currently unemployed is higher the greater has been their past inactivity, suggesting some habituation to non-work. In connection with Table 3's results these numbers present some suggestive evidence that unemployment and economic inactivity are distinct labour force statuses, at least in terms of their psychological impact.

Of a more general nature is the issue of simultaneity. Perhaps we are not really measuring scarring but that unhappy people suffer more unemployment. To address this issue, we use a fixed effects model in order to control for the possibility that those born naturally unhappy, characterised by some fixed unobserved characteristic, are biasing the results. To carry out these regressions, we have recoded life satisfaction, which is on a 0 to 10 scale, into a dummy variable according to whether life satisfaction is greater than 7 or not, there being no currently available technique for the panel analysis of ordered probit models. Table 6 thus reports the results of first a pooled logit and then a fixed effect logit. The results provide some

evidence that for males, even after controlling for fixed effects, the scarring and habituation effect hypotheses remain valid. For females however, when we examine past three years unemployment the fixed effects logit results provide only weak evidence of both hypotheses. However, column (3)'s pooled logit results are also weak, so it is unclear whether the insignificance of column (4)'s estimates comes from the elimination of fixed effects or from the loss of information due to the use of a binary dependent variable.

One interpretation of the interaction term between current and past unemployment is that it is merely proxying the duration of the current unemployment spell. It is then unsurprising that the psychological effects of unemployment are lower for those who have been unemployed longer, by a simple heterogeneity argument (those most hurt by unemployment will leave more quickly). However, the finding of the same relation in fixed effects models (where we are effectively comparing the same unemployed individual with different past three-years unemployment rates) helps to counter this interpretation.

The last part of the paper also exploits the panel aspect of the GSOEP. Using these data, we calculate the drop in well-being experienced by individuals who are employed at wave t and then unemployed at wave $t + 1$ (and this information is supplied by the same individual, which avoids problems of interpersonal comparisons of subjective measures). We can then go one wave into the future and observe these same individuals' labour force statuses at wave $t + 2$. We estimate simple probit equations to model the probability of the individual still being unemployed at wave $t + 2$.

The results are in Table 7. They show some evidence that, for men, the probability of being unemployed at wave $t + 2$ is correlated with the drop in life satisfaction from wave t to $t + 1$. The relationship estimated is such that the larger was the drop in life satisfaction from employment to unemployment (the more unemployment hurt the individual), the smaller was the probability that the individual remained unemployed one wave later. This correlation is

found controlling for the change in income from wave t to $t + 1$ (which has little explanatory power), past unemployment experience, and other demographic variables. These results suggest that the “pain” of being made unemployed acts as a spur in the short-run to finding another job.¹⁰

The combination of Table 6’s fixed effects results and those above on the probability of remaining unemployed allow us to conclude that there is a habituation effect for men, and that men who are hurt less by unemployment are more likely to remain unemployed. Taken together, these results provide some psychological evidence consistent with hysteresis: higher past levels of unemployment reduce the psychological harm associated with current unemployment, and equally reduce the probability that the same individual will exit from unemployment. Despite evidence of habituation effects in Table 3’s pooled regressions, Tables 6 and 7’s weaker results do not allow us to come to such a conclusion for women.

6. Conclusion

This paper has used eleven waves of the GSOEP to model the relationship between unemployment and life satisfaction. We find, as is usual, that current unemployment is associated with sharply lower levels of subjective well-being. Second, we appeal to the panel aspect of the data and show that past unemployment (using information from previous waves, rather than recall data) reduces the well-being of those who are currently in work: for them, past unemployment scars. Third, we show that the well-being effect of current unemployment

¹⁰ This paper thus contributes to the small literature relating subjective well-being to labour market behaviour. This literature has concentrated on job satisfaction, showing links with quits (Clark *et al.*, 1999, and Freeman, 1978), productivity (Mangione and Quinn, 1975) and absenteeism (Clegg, 1983). We believe this paper to be one of the first to use panel data to link life satisfaction to an observable labour market outcome.

is attenuated for those who have experienced more unemployment in the past, consistent with habituation. The estimated coefficients suggest that men who have been unemployed for roughly sixty per cent of their time active in the labour force over the past three years are indifferent (in terms of current life satisfaction) between current employment and unemployment. Last, we have tried to show that the change in a subjective variable from one wave to another, here the drop in life satisfaction upon becoming unemployed, contains useful information regarding individuals' subsequent behaviour in the labour market.

Our results in this paper are an attempt to bridge subjective measures of utility, of which many economists remain suspicious, with observable behaviour in the labour market. Previous attempts to test for hysteresis in the labour market using aggregate time series data have produced somewhat mixed results and are open to a number of different interpretations. To the extent that one can give credence to self-reported measures of satisfaction, our results may serve as a warning of the dangers of long-term unemployment. Not only are employers reluctant to hire those who have been unemployed for a lengthy period, but the evidence in this paper suggests that the unemployed themselves, while clearly unhappy relative to the employed, can become indifferent to the prospect of employment after a lengthy spell out of a job. If this result holds generally, the search for measures to reduce long-term unemployment takes on an even greater urgency.

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Table 1*Distribution of Life Satisfaction*

Life satisfaction	Males		Females	
	Count	%	Count	%
0	54	0.4	78	0.5
1	48	0.4	44	0.3
2	91	0.8	127	0.9
3	255	2.2	310	2.2
4	345	3.0	428	3.1
5	1370	12.2	1670	12.1
6	1149	10.2	1354	9.8
7	2423	21.5	2668	19.3
8	3586	31.9	4333	31.4
9	1293	11.5	1756	12.7
10	613	5.4	1023	7.4
Total	11228	100	13791	100

Table 2*Employment Status and Life-Satisfaction Means, by Category*

Categories	Sub-Categories	Mean Life Satisfaction	Mean <i>PASTUN3</i> (Past three-years unemployment) ¹
Male	Employed	7.186	1.74
	Unemployed	5.829	50.0
		(129.17) ²	(2413.20)
Female	Employed	7.202	1.72
	Unemployed	6.382	48.3
		(64.94)	(2346.69)
Male Employed	Three-year past unemployment above average	6.671	
	Three-year past unemployment below average	7.221	
		(55.68)	
Male Unemployed	Three-year past unemployment above average	5.367	
	Three-year past unemployment below average	6.230	
		(11.98)	
Female Employed	Three-year past unemployment above average	6.905	
	Three-year past unemployment below average	7.219	
		(12.76)	
Female Unemployed	Three-year past unemployment above average	6.538	
	Three-year past unemployment below average	6.422	
		(2.09)	

Notes: *PASTUN3* is measured as a percentage of the total time active in the labour market over the past three years. Values in parentheses are $\chi^2(1)$ statistics based on the Kruskal-Wallis test for testing H_0 : the two populations have equal means. In the general case of comparing $k \geq 2$ populations, the Kruskal-Wallis test statistic is $T = \frac{1}{S^2} \left(\sum_{i=1}^k \frac{R_i^2}{n_i} - \frac{N(N+1)^2}{4} \right)$, where $S^2 = \frac{1}{N-1} \left(\sum_{all\ ranks} R(y_{ij})^2 - \frac{N(N+1)^2}{4} \right)$, R_i is the sum of ranks assigned to the i^{th} sample, $R(y_{ij})$ is the rank assigned to y_{ij} , and N is the total number of observations. The T -statistic follows a $\chi^2(k-1)$ distribution.

Table 3

*Life Satisfaction: Current and Past Unemployment
(Ordered probit results)*

Variable	Males			Females		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Constant</i>	3.814 (13.40)	3.781 (13.28)	3.831 (13.39)	3.352 (13.67)	3.371 (13.72)	3.400 (13.83)
<i>UN</i>	-0.397 (11.74)	-0.277 (7.51)	-0.347 (8.81)	-0.288 (6.09)	-0.254 (4.76)	-0.385 (5.83)
<i>PASTUN3</i>	-	-0.455 (8.39)	-0.837 (8.13)	-	-0.074 (1.36)	-0.177 (2.68)
<i>UN×PASTUN3</i>	-	-	0.578 (4.79)	-	-	0.374 (3.19)
<i>OLF</i>	-0.438 (3.93)	-0.403 (3.60)	-0.385 (3.47)	0.066 (2.38)	0.067 (2.42)	0.071 (2.58)
<i>Part-time</i>	-0.168 (1.69)	-0.150 (1.51)	-0.137 (1.38)	0.044 (1.65)	0.044 (1.66)	0.046 (1.72)
<i>Self-employed</i>	-0.104 (2.84)	-0.111 (3.03)	-0.117 (3.18)	-0.059 (1.56)	-0.059 (1.58)	-0.059 (1.57)
<i>Income/1000</i>	0.008 (3.74)	0.008 (3.75)	0.008 (3.77)	0.025 (7.64)	0.025 (7.64)	0.025 (7.64)
<i>Pastinc3/1000</i>	0.006 (2.21)	0.005 (1.87)	0.005 (1.64)	0.009 (2.00)	0.008 (1.94)	0.009 (1.99)
<i>Age</i>	-0.077 (6.41)	-0.073 (6.08)	-0.075 (6.22)	-0.059 (5.80)	-0.059 (5.86)	-0.060 (5.95)
<i>Agesq</i>	0.0009 (6.84)	0.0008 (6.53)	0.0009 (6.68)	0.0007 (6.03)	0.0006 (6.08)	0.0007 (6.15)
<i>Educyrs</i>	0.011 (2.20)	0.010 (1.99)	0.010 (2.02)	0.011 (2.58)	0.011 (2.58)	0.011 (2.54)
<i>Nchildren</i>	-0.041 (3.36)	-0.037 (3.06)	-0.036 (2.94)	-0.041 (3.47)	-0.041 (3.52)	-0.042 (3.60)
<i>Disability</i>	-0.296 (9.40)	-0.309 (9.79)	-0.296 (9.37)	-0.496 (15.17)	-0.495 (15.14)	-0.496 (15.16)
<i>Married</i>	0.152 (4.72)	0.141 (4.39)	0.139 (4.32)	0.163 (5.80)	0.163 (5.81)	0.161 (5.74)
<i>Separated</i>	-0.520 (7.66)	-0.516 (7.61)	-0.512 (7.53)	-0.322 (4.92)	-0.322 (4.92)	-0.322 (4.92)
<i>Divorced</i>	-0.038 (0.79)	-0.020 (0.41)	-0.017 (0.36)	-0.121 (3.02)	-0.121 (3.02)	-0.117 (2.93)
<i>Owner</i>	0.200 (2.84)	0.198 (2.83)	0.194 (2.77)	0.152 (2.42)	0.153 (2.44)	0.153 (2.43)

Table 3 (continued)

Variable	Males			Females		
	(1)	(2)	(3)	(4)	(5)	(6)
μ_1	0.249 (7.08)	0.252 (7.10)	0.253 (7.07)	0.170 (6.68)	0.170 (6.68)	0.170 (6.68)
μ_2	0.515 (11.85)	0.520 (11.91)	0.521 (11.82)	0.461 (13.09)	0.461 (13.09)	0.460 (13.07)
μ_3	0.904 (18.80)	0.914 (18.90)	0.915 (18.75)	0.828 (20.97)	0.828 (20.97)	0.828 (20.98)
μ_4	1.201 (24.20)	1.211 (24.30)	1.214 (24.11)	1.120 (27.39)	1.120 (27.38)	1.121 (27.40)
μ_5	1.838 (36.00)	1.852 (36.11)	1.854 (35.83)	1.741 (41.30)	1.741 (41.27)	1.742 (41.33)
μ_6	2.184 (42.45)	2.199 (42.56)	2.202 (42.23)	2.071 (48.76)	2.071 (48.74)	2.072 (48.80)
μ_7	2.772 (53.40)	2.788 (53.50)	2.791 (53.07)	2.600 (60.70)	2.600 (60.67)	2.601 (60.75)
μ_8	3.723 (70.61)	3.740 (70.66)	3.744 (70.10)	3.497 (80.26)	3.498 (80.22)	3.499 (80.32)
μ_9	4.375 (80.71)	4.394 (80.68)	4.397 (80.01)	4.115 (92.04)	4.114 (92.01)	4.116 (92.13)
Log-likelihood	-20682.17	-20654.28	-20644.06	-25881.07	-25880.20	-25875.71
Restricted Log-likelihood	-21046.07	-21046.07	-21046.07	-26262.37	-26262.37	-26262.37
Pseudo-R ²	0.197	0.233	0.243	0.159	0.159	0.161
Sample Size	11228	11228	11228	13791	13791	13791

Notes: All models include region (federal lands) and year dummies. Absolute t-values in parentheses. Pseudo-R² = $\frac{\sum_{i=1}^N (\hat{y}_i^* - \bar{y})^2}{\sum_{i=1}^N (\hat{y}_i^* - \bar{y})^2 + N}$, where \hat{y}_i^* is the conditional expectation of the dependent variable based on the ordered probit coefficients and $\bar{y} = (1/N) \sum_{i=1}^N \hat{y}_i^*$ (see McKelvey and Zavoina, 1975).

Table 4

*Life Satisfaction: Current and Past Unemployment. Interactions with Age, Education and Children
(Ordered Probit results)*

Variable	Males			Females		
	Education	Age	Children	Education	Age	Children
<i>UN</i>	-0.344 (8.74)	-0.341 (8.64)	-0.337 (8.56)	-0.387 (5.86)	-0.386 (5.84)	-0.383 (5.79)
<i>PASTUN3</i>	-0.639 (2.36)	-0.810 (7.32)	-0.859 (6.39)	-0.632 (3.15)	-0.200 (2.55)	-0.276 (3.05)
<i>UN</i> × <i>PASTUN3</i>	-0.089 (0.28)	0.611 (4.78)	0.747 (4.92)	1.034 (3.63)	0.389 (3.03)	0.521 (3.84)
<i>PASTUN3</i> × <i>LOWEDUC</i>	-0.222 (0.78)			0.501 (2.36)		
<i>UN</i> × <i>PASTUN3</i> × <i>LOWEDUC</i>	0.725 (2.13)			-0.725 (2.49)		
<i>PASTUN3</i> × <i>YOUNG</i>		-0.193 (0.69)			0.076 (0.53)	
<i>UN</i> × <i>PASTUN3</i> × <i>YOUNG</i>		-0.693 (1.79)			0.020 (0.10)	
<i>PASTUN3</i> × <i>CHILD</i>			0.043 (0.21)			0.212 (1.62)
<i>UN</i> × <i>PASTUN3</i> × <i>CHILD</i>			-0.634 (2.75)			-0.432 (2.08)
Log-Likelihood	-20641.57	-20667.07	-20635.39	-25872.75	-25875.53	-25873.50
Restricted Log-Likelihood	-21046.07	-21046.07	-21046.07	-26262.37	-26262.37	-26262.37
Pseudo-R ²	0.240	0.239	0.197	0.163	0.161	0.165
Sample Size	11228	11228	11228	13791	13791	13791
CELL SIZES						
<i>UN</i> = 1 and <i>LOWEDUC</i> = 1		457			437	
<i>UN</i> = 1 and <i>YOUNG</i> = 1		69			85	
<i>UN</i> = 1 and <i>CHILD</i> = 1		184			141	

Notes: Absolute t-values in parentheses. Other control variables as in Table 3.

Table 5

*Past Three-year inactivity rate and life satisfaction
(Ordered probit results)*

Variable	Males	Females
<i>UN</i>	-0.412 (11.14)	-0.338 (6.44)
<i>PASTOLF3</i>	-0.149 (2.43)	-0.001 (0.98)
<i>UN</i> × <i>PASTOLF3</i>	0.187 (2.09)	0.010 (2.28)
Log-Likelihood	-20679.01	-25878.47
Restricted Log-Likelihood	-21046.07	-26262.37
Pseudo- R ²	0.195	0.160
Sample Size	11228	13791

Notes: Absolute t-values in parentheses. Other control variables as in Table 3.

Table 6

*Life Satisfaction: Current and Past Unemployment
(Fixed Effect Logit results using binary satisfaction dependent variable)*

Variable	Males		Females	
	Pooled (1)	Fixed Effects (2)	Pooled (3)	Fixed Effects (4)
<i>Constant</i>	0.415 (0.74)	-	1.064 (2.22)	-
<i>UN</i>	-0.439 (4.93)	-0.620 (3.79)	-0.480 (3.22)	-0.490 (2.17)
<i>PASTUN3</i>	-1.342 (5.55)	-1.097 (3.04)	-0.261 (2.00)	-0.159 (0.72)
<i>UN×PASTUN3</i>	1.194 (4.17)	1.077 (2.73)	0.409 (1.61)	0.066 (0.18)
<i>OLF</i>	-0.549 (2.42)	-0.271 (0.86)	0.134 (2.38)	-0.168 (1.34)
<i>Part-time</i>	-0.178 (0.98)	0.254 (0.78)	0.049 (0.95)	-0.208 (1.85)
<i>Self-employed</i>	-0.213 (2.79)	-0.088 (0.56)	-0.173 (2.28)	-0.205 (1.25)
<i>Income/1000</i>	0.015 (3.20)	0.009 (1.32)	0.059 (6.89)	0.029 (2.17)
<i>Pastinc3/1000</i>	0.009 (1.55)	0.008 (0.77)	0.008 (0.97)	-0.016 (1.10)
<i>Age</i>	-0.089 (3.65)	-0.305 (1.07)	-0.110 (5.41)	0.380 (0.74)
<i>Agesq</i>	0.001 (4.09)	0.002 (2.94)	0.001 (5.59)	0.002 (2.73)
<i>Educyrs</i>	0.039 (4.11)	-0.065 (0.70)	0.037 (4.35)	0.214 (1.58)
<i>Nchildren</i>	-0.031 (1.31)	-0.037 (0.54)	-0.035 (1.48)	-0.048 (0.67)
<i>Disability</i>	-0.459 (7.00)	-0.156 (1.03)	-0.720 (9.82)	-0.453 (3.27)
<i>Married</i>	0.210 (3.18)	0.043 (0.20)	0.287 (4.97)	0.615 (2.96)
<i>Separated</i>	-0.868 (4.93)	-1.102 (3.29)	-0.377 (2.56)	-0.248 (0.82)
<i>Divorced</i>	-0.209 (2.08)	-0.068 (0.25)	-0.122 (1.50)	0.308 (1.13)
<i>Owner</i>	0.354 (2.71)	0.180 (1.02)	0.320 (2.50)	0.378 (2.16)
<i>Region Dummies</i>	Yes	Yes	Yes	Yes
<i>Year Dummies</i>	Yes	Yes	Yes	Yes
Log-likelihood	-7654.52	-3149.85	-9371.62	-3835.73
Number of individuals		1300		1570
Sample size	11228	9089	13791	11150
Hausman test		52.95		64.08

Notes to Table 6: Absolute t-values in parentheses. The dependent variable takes value 1 if reported life satisfaction is greater than 7 and value 0 otherwise. Estimation of models in columns (2) and (4) are based on Chamberlain's (1980) conditional fixed effects logit.

Table 7

*Change in life satisfaction and Probability of remaining unemployed
(Logit results)*

Variable	Males		Females	
	(1)	(2)	(3)	(4)
<i>Constant</i>	8.161 (2.36)	8.652 (2.52)	11.173 (1.78)	10.604 (1.68)
<i>Change in Income</i>	-0.057 (1.00)	-0.053 (0.94)	0.019 (0.40)	0.010 (0.22)
<i>Change in life satisfaction</i>	0.102 (1.83)	-	-0.226 (2.11)	-
<i>Life satisfaction fell (dummy)</i>	-	-	-	1.026 (2.21)
<i>Life satisfaction fell more than 2 points (dummy)</i>	-	-0.806 (1.87)	-	-
<i>PASTUN2</i>	1.196 (2.90)	1.162 (2.83)	3.050 (4.60)	3.057 (4.63)
<i>Age</i>	-0.438 (2.96)	-0.460 (3.12)	-0.730 (2.54)	-0.727 (2.53)
<i>Agesq</i>	0.006 (3.42)	0.006 (3.58)	0.010 (2.88)	0.010 (2.87)
<i>Educyr</i>	-0.091 (1.29)	-0.097 (1.38)	-0.153 (1.13)	-0.145 (1.11)
<i>Nchildren</i>	0.069 (0.43)	0.098 (0.60)	-0.625 (1.57)	-0.575 (1.48)
<i>Disability</i>	1.072 (2.96)	1.038 (2.93)	0.901 (0.94)	0.782 (0.82)
<i>Married</i>	-0.237 (0.59)	-0.217 (0.54)	-0.463 (0.66)	-0.461 (0.65)
<i>Separated</i>	1.061 (0.89)	1.145 (0.96)	-0.471 (0.29)	-0.325 (0.19)
<i>Divorced</i>	-0.590 (0.93)	-0.648 (1.02)	0.821 (0.98)	0.947 (1.14)
<i>Regional Dummies</i>	Yes	Yes	Yes	Yes
Log-Likelihood	-163.77	-163.67	-72.03	-71.83
Percent predicted correctly	72	75	83	86
Sample Size	308	308	192	192

Notes: Dependent variable is a dummy for whether the individual remains unemployed at wave $t + 2$. All change variables refer to the period t to $t + 1$; Absolute t-values in parentheses

APPENDIX

Definition of Variables

<i>Satisfaction with life</i>	Integer response on a zero to ten scale to the question “How happy are you at present with your life as a whole?”
<i>Sathigh</i>	Dummy variable: 1 for satisfaction with life greater than 7; 0 otherwise.
<i>UN</i>	Dummy variable: 1 for currently unemployed; 0 otherwise.
<i>OLF</i>	Dummy variable: 1 for currently out-of-the labour force; 0 otherwise.
<i>PASTUN3</i>	Past unemployment in the last three years as a percentage of the total time in the labour force in the last three years.
<i>PASTUN2</i>	Past unemployment in the last two years as a percentage of the total time in the labour force in the last two years.
<i>PASTOLF3</i>	Number of months out-of-the labour force divided by the number of months in the labour force in the last three years.
$(UN\ RATE)_{t,i}$	Unemployment between $t-i$ and $t-i+1$ as a percentage of total time in the labour force between $t-i$ and $t-i+1$.
<i>LOWEDUC</i>	Dummy variable: 1 if education years less than 15 years; 0 otherwise.
<i>YOUNG</i>	Dummy variable: 1 if age less than 35; 0 otherwise.
<i>Part-time</i>	Dummy variable: 1 for part-time salaried employee; 0 otherwise.
<i>Self-employed</i>	Dummy variable: 1 for self-employed; 0 otherwise.
<i>Married</i>	Dummy variable: 1 for married; 0 for non-married.
<i>Separated</i>	Dummy variable: 1 for separated; 0 for non-separated.
<i>Divorced</i>	Dummy variable: 1 for divorced; 0 for non-divorced.
<i>Nchildren</i>	Number of children in the household.
<i>Age</i>	Age in years.
<i>Owner</i>	Dummy variable: 1 for respondents living in owned accommodation; 0 otherwise.
<i>Educyrs</i>	Years of education.
<i>Disability</i>	Dummy variable: 1 for occupational disability; 0 otherwise.
<i>Income</i>	Total household income
<i>Pastinc3</i>	Average total household income over the last three years