Why Does Unemployment Hurt the Employed?

Evidence from the Life Satisfaction Gap Between the Public and the Private Sector

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ABSTRACT

High unemployment rates entail substantial costs to the working population in terms of reduced subjective well-being. This paper studies the importance of individual economic security, in particular job security, by exploiting sector-specific institutional differences in the exposure to economic shocks. Public servants have stricter dismissal protection and face a lower risk of their organization becoming bankrupt than private sector employees. The empirical results from individual panel data for Germany and repeated cross-sectional data for the United States and Europe show that private sector employees' subjective well-being reacts indeed much more sensitive to fluctuations in unemployment rates than public sector employees'.

I. Introduction

People care about high rates of unemployment—even when they themselves are not unemployed. This is a common observation that also fits empirical facts. For example, increasing unemployment rates tend to increase suicide rates even among the employed (Platt, Micciolo, and Tansella 1992; Preti and Miotto

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1999) and voters express their dislike of high unemployment rates by reducing their support for political incumbents—even if they have not experienced an unemployment spell themselves (for example, Jordahl 2006). Moreover, people report experiencing a diminished sense of subjective well-being when the unemployment rate is higher, even after controlling for personal unemployment (for example, Di Tella, MacCulloch, and Oswald 2003). Together, the findings indicate that high general unemployment reduces individual welfare even for people who are still employed.

This paper aims to shed light on why general unemployment entails costs on the working population. Thereby, it emphasizes the role of economic insecurity. Economic insecurity is understood as the anxiety produced by a perceived economic threat; that is, the anticipatory feelings that are evoked by potential future hazards. Economic insecurity is a factor of particular interest because it itself might be a major determinant of consumption and saving behavior (for example, precautionary saving), workplace behavior (for example, investments in job-specific human capital and social capital at the workplace), and of the demand for the social insurance programs of the welfare state. High general unemployment may affect people's well-being by reducing their personal economic security, most importantly, by increasing the risk of their unemployment. A high rate of unemployment, however, also may affect the population as a whole, for example, as a result of general effects like higher crime rates or higher taxes following increased welfare spending. In order to distinguish between the general negative externalities of unemployment and changes in the economic risks that individuals face, we study workers in two sectors of the economy that differ fundamentally in their exposure to economic shocks—namely, people working in the private sector and those working in the public sector. Public sector employees usually enjoy extended dismissal protection and work in organizations that very rarely go bankrupt.[1] Thus, for institutional reasons these workers face a reduced risk of losing their jobs in comparison with workers in the private sector.

We investigate whether public servants suffer less from high unemployment than private sector workers, using data on reported life satisfaction and happiness as proxy measures for individual welfare. This approach has proven useful in many economic applications (see, for example, Clark, Frijters, and Shields 2008; Di Tella and MacCulloch 2006; Frey and Stutzer 2002a;b for reviews). Measures of subjective well-being allow researchers to capture an overall evaluation of people's experienced utility, including hard-to-measure aspects such as general concerns about the state of the economy, or anxiety about crime rates or job losses. In this kind of measurement, people report their level of subjective well-being without being focused on the specific aspects directly under study (subjective well-being as a proxy for individual welfare is further discussed below).

The main empirical analysis uses data from the German SocioEconomic Panel (GSOEP) for West Germany between 1984 and 2004. During this period, West Germany experienced large differences and fluctuations in regional unemployment rates—from 3.7 percent to 20.2 percent. These fluctuations in the unemployment

1. Our main analysis is for Germany, where overindebted jurisdictions can expect a bailout. In fact, both Saarland and Bremen received a bailout in 1993.

rate over a long period of time allow us to identify any sectoral differences in workers' sensitivity to unemployment. Moreover, the panel aspect of the data allows us to control for individual heterogeneity. The general results show that people working in the private sector are affected more strongly by general economic shocks than are those working in the public sector. The life satisfaction of private sector employees decreases substantially when unemployment rates are high. People working in the public sector experience much smaller changes in their well-being in response to fluctuations in unemployment rates. Private sector employees' life satisfaction is reduced by 0.60 points (on a scale between 0 and 10) when regional unemployment rises from the lowest value in the sample (Baden-Wuerttemberg) to the highest value (Berlin in 2003)—similar to the effect of becoming personally unemployed. In comparison, the negative effect on public sector employees is about a third lower than for private sector employees. For public servants—a particularly well-protected subgroup of all public sector employees[2]—we find no negative correlation whatsoever between regional unemployment and reported life satisfaction. These findings hold after controlling for differences in wage structure and working conditions in the two sectors, as well as for demographic characteristics and time-invariant individual heterogeneity. A series of potential confounding factors from selection are discussed in an extensive sensitivity analysis.

Overall, the results suggest that a substantial fraction of the psychic costs brought about by general unemployment is due to increased economic insecurity. General regional externalities of high unemployment rates, such as higher crime rates, seem to have relatively minor consequences for individual well-being shown by the small drop in well-being for public servants.

The qualitative results also hold when the analysis is performed for the United States, using repeated cross-sectional data from the General Social Survey (GSS), and for member countries of the European Union, using repeated cross-sectional data from the Eurobarometer (EB). In both data sets, the well-being of people in the public sector is less sensitive to fluctuations in unemployment rates than is the life satisfaction of people in the private sector. However, the differences are less precisely measured than in the analysis for Germany.

This research is related to various strands of literature that, however, are barely linked so far. In addition to the mentioned literature on subjective well-being, there is a small amount of literature on economic insecurity that mainly concentrates on job insecurity (recent work includes, for example, Stephens 2004; Green 2006; Campbell et al. 2007). Several studies analyze the consequences of job insecurity for health outcomes (meta-analyses are provided in Bohle, Quinlan, and Mayhew 2001; Sverke, Hellgren, and Näswall 2002). Other work discusses the measurement of economic insecurity, for example, analyzing subjective perceptions of economic hazards (for example, Dominitz and Manski 1997). In our main analysis, we study the welfare consequences of economic insecurity taking the regional rate of unemployment as a proxy for economic threats.

2. In Germany, there are two types of public sector workers: public servants ("Beamte"), who enjoy the strictest dismissal protection, and other people working in the public sector, who are employed under the regular labor law (Ebbinghaus and Eichhorst 2009).

In addition, the study of differentials in individual well-being sheds light on the discussion about whether public servants enjoy any rents. Bureaucratic rents, or utility premiums of government sector workers relative to private sector workers, can be created by high wages, fringe benefits and job amenities, or the possibility of extracting bribes. In previous work using a cross-section of 42 countries, we found that there was a strong correlation in the differentials in life satisfaction between public sector employees/private sector workers and irregular payments to bureaucrats (Luechinger, Meier, and Stutzer 2008). The results of this study indicate that the high economic security enjoyed by public sector employees is a valuable fringe benefit of public sector employment that should be taken into account in analyses of labor market rents and of compensation differentials between the public and the private sector.

The paper proceeds as follows: Section II discusses potential reasons for the costs of unemployment for the employed. In Section III, the idea of a life satisfaction gap between employees in the public and the private sectors is explained. Section IV presents the empirical analysis for Germany, Section V, the empirical analysis for the United States, and 13 European countries. Section VI offers concluding remarks.

II. Unemployment and People's Well-Being

A. Unemployment Reduces Subjective Well-Being

Unemployment, first of all, reduces the individual well-being of those personally affected. In their innovative work for Britain, Clark, and Oswald (1994, p. 655) summarize their results as follows: "Joblessness depresses well-being more than any other single characteristic including important negative ones such as divorce and separation." For Germany, based on individual panel data, Winkelmann and Winkelmann (1998) find a negative effect of personal unemployment on life satisfaction that would require a sevenfold increase in income to compensate. Importantly, in these two analyses, indirect effects (like income losses) that may, but need not, accompany personal unemployment are kept constant. Being unemployed therefore has psychic costs over and above the potential decrease in the material living standard.[3]

High unemployment rates also have nonnegligible effects on people who are not personally affected by unemployment. Based on survey data from population samples from European Union member countries between 1975 and 1992, Di Tella, MacCulloch, and Oswald (2003) show that aggregate unemployment decreases average reported life satisfaction even if personal unemployment is kept constant. The cumulative costs of unemployment are substantial. According to their estimation, the average individual in the working population would have to be compensated with approximately $200 to offset the loss in life satisfaction caused by a typical

3. For references and a discussion of psychological and social factors determining the drop in life satisfaction of people who become unemployed, see Frey and Stutzer (2002a: 95–109). The specific effect of social work norms on unemployed people's subjective well-being is studied empirically in Clark (2003) and Stutzer and Lalive (2004).

Figure 1

Unemployment and Life Satisfaction of Working People in West Germany

Notes: Life satisfaction of 18-to-65-year-old individuals working full-time or part-time in West Germany. Source: GSOEP 1984–2004 and Federal Statistical Office Germany.

U.S.-size recession (that is, a recession that entails a 1.5 percentage point increase in the unemployment rate).[4]

Figure 1 depicts the effect of high general unemployment on the life satisfaction of people in the work force living in West Germany, based on data from the GSOEP. These are the same data that we will introduce in our main analysis. For the period between 1984 and 2004, average, unweighted, regional unemployment rates (right axis) and average life satisfaction (left axis) are plotted for people who were employed full- or part-time and who were between the ages of 18 and 65. The rate of unemployment fluctuates between a low of 6 percent in 1991 and a high of 11 percent in 1997. Life satisfaction, measured on an 11-point scale from 0 ("completely dissatisfied") to 10 ("completely satisfied"), moves countercyclically over almost the whole period. When unemployment rates decrease, workers report higher life satisfaction and vice versa. The raw correlation between the regional rate of unemployment and average regional life satisfaction is –0.45 ($p < 0.05$). This negative correlation between the unemployment rate and people's reported life satisfaction is evident despite the extended employment protection in German labor law. The question that naturally arises is why even people who are employed feel so much less satisfied with their lives when unemployment rates increase.

4. Interestingly, there are systematic differences in the experienced reduction in life satisfaction. Di Tella and MacCulloch (2005) find that the sensitivity to unemployment differs according to individuals' political orientation. Left-wing voters care more about unemployment (relative to inflation) than do right-wing voters.

B. Costs of High Unemployment for the Employed

The potential reasons that explain why workers' well-being decreases when unemployment rates increase can be divided into two broad categories:

First, a high rate of unemployment may have general negative effects on society that affect everybody in a region. Such reasons include not only the direct effects of unemployment on crime and public finances, but also the general increase in income inequality within a society—an increase that may have the effect of triggering workers' empathy with the unemployed. However, there might be a countervailing effect from social comparisons as employed people might feel better off when their relative standing increases.

Second, high unemployment rates affect factors specific to people's individual workplaces. These reasons include changes in working hours and salaries and, most importantly, a change in the actual and perceived probability of job loss.

1. General effects of unemployment on society

Unemployment leads to social problems that affect people in general. For example, higher unemployment has been observed to increase crime (see, for example, Oester and Agell 2007; Raphael and Winter-Ebmer 2001). In Germany, right-wing crime is positively correlated with regional unemployment rates (Falk and Zweimüller 2005). If higher crime rates are reflected in lower reported well-being, this can explain the statistical relationship between unemployment rates and subjective well-being. High unemployment also has fiscal effects that may worry the general population. In particular, if unemployment rates are as high as they were in Germany in the second half of the 1990s, the fiscal burden may rise to a level that concerns the working population. These general effects are expected to influence all workers alike independent of their sectoral employment.

People also care about the well-being of others and about inequality within a society. Schwarze and Härpfer (2007) present evidence for Germany that people of all income classes report lower life satisfaction when regional income inequality increases. This may be due to inequality aversion and/or to empathy for the poor. Similarly, if economic shocks increase unemployment, people may care about the fate of the people who experience unemployment, reducing their own sense of well-being. However, there also might be a reverse effect if employed people compare their situation to the lot of the increasing crowd of unemployed and feel better off.

2. Effects of unemployment on economic security

High unemployment rates have effects on individuals' contemporaneous and future economic situations. In times of high unemployment, the pressure on salaries increases, leading to lower average wages (see the literature on the wage curve by Blanchflower and Oswald 1994). Because income correlates positively with people's well-being, depressed salaries may explain the lower life satisfaction in times of high unemployment. Moreover, working conditions may become harsher in times of high unemployment. In particular, actual working hours may rise in recessions as firms cut costs and fear of redundancy and scarcity of alternative job opportunities enable firms to force employees to work more hours than they would prefer (see

Stewart and Swaffield 1997, for Britain). This reduces people's leisure time—sometimes without financial compensation. If not taken into account statistically, a negative relationship between the unemployment rate and life satisfaction could thus reflect either depressed salaries or reduced leisure time after economic shocks.

The above-mentioned effects on salaries and working hours refer to realized consequences. However, high unemployment also affects anticipated economic distress, as, for instance, the probability that a worker may himself experience a spell of unemployment in the future increases. Other people's unemployment might thus primarily affect people through the information conveyed about potential hazards and not through social comparisons.[5] Moreover, people also may expect salary decreases, reduced promotion opportunities, fewer possibilities to change occupations, etc.

In the remainder of the paper, we use the term economic insecurity when addressing the psychic costs of negative anticipatory feelings due to both worries and fear about job loss or, alternatively, an income reduction in the future and to the many consequences that might follow (like reduced social status, loss of a social network, necessary adjustments in consumption habits, etc.).

III. The Life Satisfaction Gap Between Employees in the Public and the Private Sectors

To study the importance of the effects of high unemployment on individuals' economic insecurity (independent of general effects on society), we compare the subjective well-being of workers in the public and private sectors. This approach hinges on specific assumptions and conditions with regard to the quality of the subjective well-being data as well as the characteristics of the labor market.

A. Subjective Well-Being as a Proxy for Individual Welfare

For the question at hand, the validity of the subjective well-being method depends on three main conditions:

(1) Subjective well-being scores contain information on the respondent's *global* evaluation of his or her life. It is necessary in other words, that reported attitudes are not merely arguments in the utility function, or a subutility function, as Kimball and Willis (2006)—in our mind, rightly—conjecture for measures of current affect. The problem of only analyzing a subutility function holds for all empirical measures to a greater or lesser degree. Here, data on reported satisfaction with life is used that is understood to refer to the cognitive component, the rational or intellectual

5. Social comparisons are a prevalent issue in economic happiness research. There is, however, only limited work on social comparisons in the unemployment domain (for example, Clark 2003). We are not aware of any research on social comparisons of employed people with their unemployed "peers." Two countervailing factors are likely to operate. On the one hand, there is an information, signaling or fear effect (the main argument in our paper). On the other hand, there is the classical comparison effect in terms of relative standing (as mentioned in the main text). This latter effect would counteract some of the general negative consequences of unemployment on society.

aspects of subjective well-being (Lucas, Diener, and Suh 1996). Behind the score indicated by a person lies a cognitive assessment of the extent to which their overall quality of life is judged in a favorable way (Veenhoven 1993). This includes—in our context—hard-to-measure aspects such as general concerns about the state of the economy, or anxiety about crime rates or job losses. Based on this, we assume that the standards underlying people's life satisfaction judgments are sufficiently close to those that the individual would like to pursue in order to maximize welfare.

(2) Measurement error for reported subjective well-being is not correlated with the variables of interest. Schwarz and Strack (1999) document that well-being reports are susceptible to the ordering of questions, the wording of questions, and actual mood, for example. In our main analysis based on the GSOEP, we use a question of overall life satisfaction. Throughout the panel, this question is asked at the end of the questionnaire after a bloc of questions on marital status and family relations. In this setting, we see no indication for the labor market situation priming subjective well-being responses.

(3) Reported life satisfaction contains *sufficient* information (relative to noise) about actual individual welfare that statistical research is fruitful. There is substantial evidence for this. Measures of reported subjective well-being passed a series of validation exercises: They correlate with behavior and aspects generally associated with people's happiness. Reliability studies have found that reported subjective well-being is moderately stable and sensitive to changing life circumstances. Consistency tests, for instance, reveal that happy people are more likely to be rated as happy by friends and family members (for references, see Frey and Stutzer 2002b; Clark, Frijters, and Shields al. 2008).

B. Sectoral Differences in Job Security

The public and the private sectors differ sharply in objective job security for two main reasons:

(1) Public sector employees often enjoy special legal protection from dismissals. In Germany, for example, public servants' labor contracts are specified in an extra law. According to this law, public servants enjoy very strict job protection. They can be dismissed only if convicted of an offense that results in (i) at least one year in prison for criminal charges or (ii) six months in prison for homeland security charges (paragraph 48 of the laws for civil servants).[6]

(2) Employment in the public sector is less volatile than in the private sector (for evidence for the United States, see, for example, Freeman 1987). The lower sensitivity of public sector employment to economic shocks is due not only to different employment contracts, but also to the fact that financial pressure to reduce employment in a recession is lower in the public sector than in the private sector. While private firms can go bankrupt, communes, states, and public companies rarely do.

6. Public employees who are employed under the collective labor agreement of the civil service do not have lifelong tenure. However, after a period of employment of 15 years and after reaching the age of 40, these employees can be dismissed only for important reasons, such as theft, absenteeism, or drug abuse at work, or if no longer able to work as a result of long-term sickness (Ebbinghaus and Eichhorst 2009).

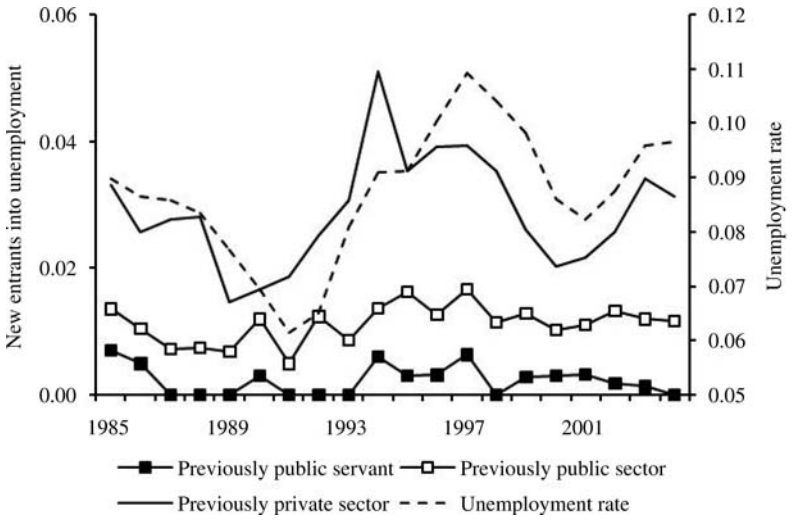

Figure 2

New Entrants into Unemployment in West Germany

Notes: Share of individuals aged 18 to 65 who were unemployed at time t but who worked full-time or part-time at time *t*-1 in West Germany. Source: GSOEP 1984–2004 and Federal Statistical Office Germany.

On the contrary, the public sector may keep employment high during a recession as a countermeasure to the economic downturn.

The fact that queues for government jobs lengthen during recessions (Krueger 1988) may indicate that high unemployment rates also mean lower job security, and thus prompt people to seek more secure (that is, governmental) jobs. Consistent with this idea, a survey of a representative sample of young French persons between the ages of 20 and 30 found that more than three-quarters wanted to work in the public sector—at a time when youth unemployment rates were far above the already high general unemployment rate of 10 percent. Furthermore, these respondents explicitly stated that they wanted to do so because of increased job security (*The Economist* 2006).

Figure 2 presents evidence in support of the argument that the public and private sectors differ in the *objective* job security they offer. The figure shows the proportion of people entering unemployment from 1985 to 2004 in West Germany in the two sectors. The reported fractions are calculated from the GSOEP. The series for public sector employees is shown in total, as well as for public servants only. The figure shows that the probability of experiencing a spell of unemployment moves with the unemployment rate for people working in the private sector. For people employed in the public sector, the probability of entering unemployment is much lower and much less sensitive to economic fluctuations. For the subgroup of public servants, the probability is below 1 percent and shows no clear correlation with general trends in unemployment.

Thus, both theoretical arguments and empirical evidence suggest that we can break down the negative effect of high unemployment on reported subjective well-being into general negative externalities on the one hand and reduced economic security on the other hand by comparing the sensitivity of life satisfaction to changes in the unemployment rate across the public and the private sectors. While the life satisfaction of private sector employees is affected by general externalities and the reduction in economic security, the life satisfaction of public sector employees is affected by general externalities only; hence, the difference reflects the importance of economic security.

C. Further Empirical Challenges

When interpreting how workers' life satisfaction in the private and public sectors is influenced by high unemployment rates, two factors may complicate the issue:

(1) The two sectors may differ in other dimensions than economic or job security. These dimensions may be responsible for the differential effects of economic shocks on workers' well-being. As discussed above, two relevant differences are in wages and working hours. According to the literature on the wage curve, wages in the public sector are usually much less sensitive to the regional unemployment rate than are wages in the private sector (see Blanchflower and Oswald,1994 for the United States and the United Kingdom; Sanz-de-Galdeano and Turunen 2006 for the Euro area). If not statistically controlled for, variation in the life satisfaction gap may just reflect differences in the pattern of wages over time. In the empirical analysis, hourly wages and total household income are included to control for this possible factor. A related argument applies to differences in working conditions, which may become relatively harsher in the private sector than in the public sector during times of high unemployment. We control for actual working hours in the main analysis.

(2) Workers in the private and the public sectors may differ in both observable and unobservable characteristics. Since people self-select into the two sectors, this could bias the estimated correlations. Several reasons for self-selection are possible.[7]

First, people might choose between the two sectors according to their risk aversion. In line with a common preconception, Pfeifer (2008), based on a measure of unemployment risk attitudes, and Bonin et al. (2007), using an experimentally validated measure of risk aversion, find that in Germany public sector workers are more risk-averse than private sector workers. If this were the case in the present application, self-selection would likely bias the results against finding a difference between the two sectors in the sensitivity of life satisfaction to fluctuations in the unemployment rate.[8] The estimates of the importance of economic security would

7. Luechinger, Stutzer, and Winkelmann (2006) study self-selection into the government and private sectors and show that there are indeed substantial welfare gains from matching.

8. Self-selection would imply that the average individual in the public sector is more risk-averse than the average individual in the private sector. As the life satisfaction of individuals with strong risk aversion is more sensitive to changes in the unemployment rate than is the life satisfaction of individuals with weaker risk aversion, the smaller response in the public sector than in the private sector would not be just an artifact of self-selection bias. Rather, in the hypothetical case of random assignment of individuals to the two sectors, a larger number of strongly risk-averse individuals would be exposed to the greater uncertainty of the private sector and, hence, an even larger difference between the two sectors in the sensitivity of life satisfaction to changes in the unemployment rate would be observed. Fuchs-Schündeln and Schündeln (2005) make a similar argument about self-selection into occupations and the measurement of precautionary savings.

represent a lower bound when extrapolated to the average person in the work force. In contrast, if relatively risk-loving people would work in the public sector in Germany, the opposite would hold and differences in risk preferences also partly could explain any observed difference in the sensitivity to unemployment.

Second, people might self-select according to characteristics that are correlated with the capacity to bare economic risks, rather than according to risk preferences. In particular, more educated people and workers with longer tenure might be better able to deal with perceived economic threats. If these people are more likely to work in the public sector, any observed sector-specific effect of general unemployment on reported subjective well-being might only partly be attributed to differences in economic security.

Third, the anticipatory feelings provoked by economic hazards might well depend on prior experiences. People who suffered from being unemployed in the past might be more depressed by economic insecurity when the rate of unemployment increases. If past unemployment spells were more likely for private sector workers, the latter group would be expected to be more sensitive to changes in the rate of unemployment.

In a series of sensitivity tests in Section IVC, the robustness of the results with regard to the mentioned potential confounding factors is studied.

IV. Empirical Analysis for Germany

A. Data and Summary Statistics

The main empirical analysis is based on data from the German SocioEconomic Panel (for a general description of the GSOEP, see Wagner, Burkhauser, and Behringer 1993). We use information from the 21 annual waves between 1984 and 2004 for West Germany. The GSOEP is the longest individual panel data set with information about both people's subjective well-being or life satisfaction and their sector of employment. Based on our research question about the effects of unemployment on people active in the work force, the sample is restricted to people who are—at the time of the interview—employed full-time or part-time and who are between 18 and 65 years old. For details about the data set and the sample restrictions, see Appendix 1. In total, our unbalanced panel includes 104,258 observations from 19,022 individuals.

Individuals' life satisfaction is measured with a single-item question on an 11-point scale: "How satisfied are you with your life, all things considered?" Responses range on a scale from 0 ("completely dissatisfied") to 10 ("completely satisfied"). In our sample, 6.5 percent report being completely satisfied with life (score = 10) and about 52.4 percent report life satisfaction in the top three categories. About 1.2 percent fall into categories 0 to 3 at the bottom of the scale. On average, people's life satisfaction is at a level of 7.3 on the scale from 0 to 10. For a broader discussion on life satisfaction in Germany based on the GSOEP, see Frijters, Haisken-DeNew, and Shields (2004) and Stutzer and Frey (2004).

The sector of employment is determined based on reported employment in the public sector and reported occupational position within the public sector. In Ger-

many, there are two types of public sector workers: public servants ("Beamte"), who enjoy the strictest dismissal protection, and other people working in the public sector, who are employed under the regular labor law (Ebbinghaus and Eichhorst 2009). The largest public sector employers in Germany are the subfederal units, the Laender. Over the entire period, 77,929 observations are for the private sector, and 26,329 observations are for the public sector including 8,939 public servants. Individual's sector of employment is defined on a year-to-year basis. Thus our sample includes individuals who changed between sectors over time (for a detailed description of sectoral transitions, see Appendix 1). The implications of the inclusion of changers for the estimations are discussed in Section IVC. We also test the robustness of the results focusing on those who never changed the sector or the public servant status.

Regional unemployment is measured at the state or Laender level (see Appendix 1 for additional information). Between 1984 and 2004, the average unemployment rate was 8.7 percent with a minimum of 4 percent in Baden-Wuerttemberg in 1991 and a maximum of almost 20 percent in West Berlin in 2003.

Table 1 presents summary statistics of the main variables separately for individuals working in the private sector, the public sector, and as public servants (for detailed descriptions of the variables, see Appendix 1). Important for our analysis, individuals working in the public sector or as public servants differ somewhat in observable sociodemographic characteristics from individuals working in the private sector. For example, on average, people working in the public sector earn more than people in the private sector. They also are better educated. Since all these factors may be important in determining individuals' well-being, we control for them in the empirical analysis. Moreover, private sector and public sector worker differ in employment specific dimensions. Most importantly, they differ in tenure and in their unemployment history, with public sector workers having longer tenure and being less likely to have experienced personal unemployment. In Section IVC, we test whether these differences influence the results for the private/public sector life satisfaction gap.

B. Sectoral Differences in the Costs of General Unemployment

The results for the private/public life satisfaction gap are presented in two steps: in a graphical analysis, raw differences are studied while the main analysis applies multiple regression techniques. Figure 3 plots the unemployment rate (right axis) and the difference in life satisfaction between public servants and nonpublic servants (left axis) in West Germany between 1984 and 2004. The bigger the difference, the more satisfied are public servants relative to nonpublic servants. The raw differences show a clear relationship with the unemployment rate. If the unemployment rate increases, the life satisfaction differential grows; public servants become more satisfied relative to nonpublic servants.

The results from the graphical analysis are studied further in econometric model specifications that allow us to quantify the observed correlation and to control for important socioeconomic characteristics. We estimate regressions of the following form:

$$(1) \quad SWB_{its} = g(\beta_1 Sector_{its} + \beta_2 UR_{ts} + \beta_3 Sector_{its} \times UR_{ts} + \beta_4 \bar{X}_{its} + \Psi_t + \Omega_s + \Theta_i + \varepsilon_{its})$$

Table 1
Summary statistics

	(1) Private sector	(2) Public sector	(3) Public servants	(4) Total
Life satisfaction	7.255	7.369	7.540	7.284
	(1.659)	(1.617)	(1.516)	(1.649)
Concerns about job security	1.673	1.350	1.126	1.591
	(0.707)	(0.593)	(0.381)	(0.694)
Concerns about own economic situation	1.889	1.684	1.455	1.837
	(0.676)	(0.665)	(0.589)	(0.679)
Ln(hourly income)	2.118	2.262	2.530	2.154
	(0.478)	(0.449)	(0.410)	(0.475)
Ln(household income)	10.252	10.317	10.476	10.268
	(0.525)	(0.512)	(0.472)	(0.523)
Actual working hours	40.192	37.947	40.594	39.625
	(11.203)	(10.334)	(9.451)	(11.033)
Working part-time (=1)	14.2	20.8	11.9	15.9
Female (=1)	36.8	48.5	29.0	39.7
Age	39.382	41.546	42.917	39.929
	(10.935)	(10.848)	(10.656)	(10.954)
Single (=1)	22.0	20.6	17.5	21.7
Married (=1)	67.4	67.5	71.6	67.4
Separated (=1)	1.8	2.2	2.5	1.9
Divorced (=1)	6.8	8.0	7.6	7.1
Widowed (=1)	1.5	1.6	0.8	1.5
(Household size)$^{1/2}$	1.723	1.664	1.669	1.708
	(0.398)	(0.385)	(0.377)	(0.395)
Children in household (=1)	46.3	40.9	42.0	45.0
Head of household (=1)	60.4	59.9	71.3	60.3
Ln(years of education)	2.401	2.514	2.640	2.430
	(0.208)	(0.233)	(0.224)	(0.220)
NonEU foreigner (=1)	13.7	5.0	0.2	11.5
EU citizen (=1)	75.3	91.3	99.1	79.3
German citizen (=1)	11.0	3.7	0.7	9.2
Partner unemployed (=1)	2.9	2.1	1.3	2.7
Tenure	9.944	13.201	18.025	10.771
	(9.002)	(10.084)	(10.675)	(9.396)
Unemployment history	0.034	0.022	0.007	0.031
	(0.096)	(0.077)	(0.042)	(0.091)
Parent (=1)	58.4	57.6	54.9	58.2
Risk preferences (only for year 2004)	4.794	4.619	4.880	4.745
	(2.255)	(2.138)	(2.030)	(2.224)
Number of observations	77,929	26,329	8,939	104,258
Number of individuals	15,162	5,675	1,713	19,022

Note: Tables shows percentages for dummies and for continuous variables means and standard deviation in parentheses.
Source: GSOEP 1984–2004.

Figure 3

Unemployment and the Life Satisfaction Differential Between Public Servants and Nonpublic Servants in West Germany

Source: GSOEP 1984–2004 and Federal Statistical Office Germany.

where SWB_{its} is individual i's subjective well-being in time t in state s. $Sector_{its}$ stands for the dummy variables capturing whether people work in the public sector ($=1$) or in the private sector ($=0$), and whether people are public servants ($=1$) or not ($=0$), respectively. Since all public servants work in the public sector, the estimated coefficient for public servants shows the difference in life satisfaction for being a public servant over and above the effect of working in the public sector at the mean rate of regional unemployment. UR_{ts} is the means adjusted rate of unemployment in year t and state s. In order to see how the difference in life satisfaction between the public and the private sectors varies with the unemployment rate, the two variables for public sector employment are interacted with the rate of unemployment ($Sector_{its} \times UR_{ts}$). $\bar{X}_{its}$ is a vector of personal characteristics. Ψ_t and Ω_s are time and state-level fixed effects to control for time-invariant differences between the states and for factors affecting West Germany as a whole in a given year. They are included in all the regressions. Θ_i is an individual fixed effect which absorbs any person-specific and time-invariant effects. ε_{its} are robust standard errors adjusted for clustering at the level of the individual.[9] $g(.)$ is the function that determines the type of regression method used (OLS or ordered probit).

The estimated coefficients β_1, β_2, and β_3 show the effect of working in the public sector and the differential effect of unemployment on public and private sector

9. Generally, clustering at the level of the individual yields the largest standard errors, that is the most conservative estimates of statistical significance, for the coefficients of interest. Exceptions are the standard errors for the direct effect of unemployment, which are slightly larger if a correlation between the errors at the state level is allowed for (see Table A1 in the Appendix 2).

worker's life satisfaction. If public sector workers report higher life satisfaction at the mean unemployment rate, we would expect $\beta_1 > 0$. If unemployment negatively affects private workers' life satisfaction, $\beta_2 < 0$ is expected. If people in the public sector are less hurt by unemployment than people in the private sector, we would expect $\beta_3 > 0$; that is, the interaction term between the unemployment rate and the public sector would be positive.

In the following, we estimate six different variations of this regression: As the dependent variable is ordinal, we compare methods in which $g(.)$ assumes cardinal (OLS) and ordinal (ordered probit) dependent variables. As documented in previous studies on subjective well-being (Ferrer-i-Carbonell and Frijters 2004), we do not find substantial differences between treating the dependent variable cardinally or ordinally. In a next step, we add personal characteristics, $\bar{X}_{its}$, to the regressions. In Section IVC, we additionally let a number of control variables interact with the unemployment rate. Individuals differ with regard to many time-invariant unobservable characteristics such as optimism that might be correlated with reported subjective well-being and the sector of employment. We control for such time-invariant individual characteristics by adding individual fixed effects, Θ_i, and compare the results to estimations without individual fixed effects.

Table 2 shows the main results. Columns 1 and 2 report results of OLS and ordered probit estimations without controlling for personal characteristics and without individual fixed effects. The results for both models are very similar and show the following pattern:

Importantly, regional unemployment is negatively correlated with the life satisfaction of people working in the private sector ($p < 0.01$). Estimating marginal effects of the ordered probit regression shows that, if regional unemployment increases by one percentage point, the fraction of private sector workers reporting life satisfaction of 8 or higher is reduced by 0.87 percentage points. The coefficient on the first interaction term indicates that public sector employees are less affected by regional unemployment than are people working in the private sector. The estimated effect for the ordered probit regression of a one percentage point increase in the unemployment rate is a reduction of 0.26 percentage point in the probability of experiencing high life satisfaction (a score of 8 or higher) for these workers (public sector but not public servant workers) ($-0.87 + 0.61$). The second interaction term indicates that public servants may be even less affected by regional unemployment (n.s.). The differential effect of regional unemployment on the life satisfaction of private and public sector workers in total indicates that general unemployment hurts the latter group much less.

The panel at the bottom in all of the following tables summarizes the effect of unemployment on the different groups of employees. It shows that while for private sector employees unemployment has a significant negative effect on life satisfaction, it does not have this effect for public sector employees. An F-test for the joint significance of the two interaction terms (that is, whether unemployment affects workers in the public sector including public servants differently from workers in the private sector) shows that they are significant at the 99 percent level. These results suggest that the negative effect of unemployment on the employed is mainly due to sector-specific economic risks and not due to general regional effects.

Table 2
Baseline regressions

Dependent variable Life satisfaction	(1) OLS	(2) Ord. Probit	(3) OLS	(4) Ord. Probit	(5) FE OLS	(6) FE POLS
Sector and position						
Private sector	Reference group					
Public sector	0.033	0.023	0.026	0.019	0.010	0.005
	(0.027)	(0.017)	(0.027)	(0.017)	(0.030)	(0.018)
Public servant	0.246**	0.150**	0.067	0.051(*)	−0.061	−0.027
	(0.044)	(0.028)	(0.044)	(0.029)	(0.077)	(0.046)
Unemployment rate (UR)						
State unemployment rate	−0.032**	−0.022**	−0.031**	−0.021**	−0.036**	−0.023**
	(0.011)	(0.007)	(0.011)	(0.007)	(0.012)	(0.007)
Interaction terms						
Public sector × UR	0.025**	0.015**	0.021*	0.014*	0.012	0.007
	(0.009)	(0.006)	(0.009)	(0.006)	(0.009)	(0.005)
Public servant × UR	0.017	0.010	0.014	0.007	0.034*	0.019*
	(0.015)	(0.010)	(0.015)	(0.010)	(0.015)	(0.009)
Individual characteristics	No	No	Yes	Yes	Yes	Yes
State-specific effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-specific effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual-specific effects	No	No	No	No	Yes	Yes

(continued)

Table 2 *(continued)*

Dependent variable Life satisfaction	(1) OLS	(2) Ord. Probit	(3) OLS	(4) Ord. Probit	(5) FE OLS	(6) FE POLS
F, Wald χ^2	19.56**	788.93**	33.54**	1990.73**	26.810**	31.100**
R^2, Pseudo R^2, R^2 within	0.011	0.004	0.043	0.012	0.031	0.035
Number of observations	104,258	104,258	104,258	104,258	104,258	104,258
Number of individuals	19,022	19,022	19,022	19,022	19,022	19,022
Effect of unemployment for						
Private sector employees	−0.032**	−0.022**	−0.031**	−0.021**	−0.036**	−0.023**
	(0.011)	(0.007)	(0.011)	(0.007)	(0.012)	(0.007)
Public sector employees	−0.007	−0.007	−0.010	−0.008	−0.025(*)	−0.016*
	(0.013)	(0.008)	(0.013)	(0.008)	(0.014)	(0.008)
Public servants	0.010	0.003	0.005	−3.4E-4	0.009	0.003
	(0.016)	(0.010)	(0.016)	(0.010)	(0.017)	(0.010)
Test for joint significance of interaction terms						
F, χ^2	7.00**	13.28**	5.28**	9.82**	5.86**	5.49**

Notes: Robust standard errors in parentheses adjusted for clustering on the individual level. Individual characteristics include ln(hourly income), ln(household income), working hours, working hours squared, household size, ln(years of education) and dummies for working part-time, gender, age categories, marital status, children in household, head of household, citizenship, and whether partner is unemployed. For the full results, see Table A2 in the Appendix 2.
Source: GSOEP 1984–2004.
Level of statistical significance: $^{(*)}$ $p < 0.1$ * $p < 0.05$, ** $p < 0.01$

Additionally, the results show that not controlling for any observable characteristics, public servants report a statistically significant higher life satisfaction than other public sector employees. The difference between public and private sector employees is small and statistically insignificant.

The two sectors may differ in other aspects than job security. In particular, the comovement of wages and working hours with economic shocks may be quite different between the two sectors and as a consequence may explain the sectoral differences in how workers' well-being is affected by high unemployment rates. Furthermore, as was apparent in the summary statistics, public sector workers differ in various observable characteristics such as education. Columns 3 and 4 show OLS and ordered probit estimations controlling for differences in wages, working hours and a number of personal characteristics (the full results of Table 2 can be found in Table A2 in Appendix 2).

Adding personal characteristics has little effect on our main results. As before, the effect of unemployment on public sector employees is only around one third the effect on private sector employees. The point estimate of the interaction term for public servants suggests again no effect of regional unemployment on their life satisfaction. The two interaction terms are jointly highly statistically significant. Thus, differences in the wage curves between the sectors cannot explain the finding that public sector workers are less affected than private sector workers by high levels of unemployment. The additional control variables for observed individual characteristics, however, explain about two-thirds of the difference in average life satisfaction between public servants and nonpublic servants.[10]

Columns 5 and 6 show the effect of regional unemployment on life satisfaction within individuals. We control for individual heterogeneity by adding individual fixed effects in either an OLS regression or in a Probit-adapted OLS regression.[11] The qualitative results for the effect of unemployment are the same as in Columns 1 and 2. The test of whether the interaction terms between the rate of unemployment and public sector/public servant status jointly differ from zero shows that people working in the public sector are less affected by general unemployment than people working in the private sector ($p < 0.01$). Looking at the results in Column 5, public sector employees (below the status of public servant) experience a negative effect from unemployment that is about one-third smaller than that experienced by workers in the private sector. When regional unemployment increases by one percentage point, life satisfaction is reduced by 0.025 points for the former, and by 0.036 points for the latter group. The point estimate for public servants is even slightly positive

10. The results for the control variables (reproduced in Table A2 in Appendix 2) are in line with previous findings for Germany. In particular, wages and household income are positively correlated with subjective well-being. Other control variables show that life satisfaction increases with the number of weekly working hours up to about 33 hours and decreases afterward. Unemployment of a person's partner results in substantially lower reported life satisfaction.

11. Even though the previous results showed almost no difference in treating the dependent variable as ordinal or cardinal, the Probit-adapted OLS method allows us to estimate individual fixed effects models taking into account that the dependent variable is ordinal. Thereby, we transform the dependent variable by taking the expectation of a double truncated standard normal variate where the truncation points are derived from the marginal distribution of the satisfaction variable (see Ferrer-i-Carbonell and van Praag 2004).

at 0.009 points (but not statistically different from zero). If the two groups of employees in the public sector are taken together, the life satisfaction of workers in the private sector is reduced by 0.035 points, while that of workers in the public sector is reduced by 0.017 points (by an increase of unemployment of one percentage point). To put the size of the effects in perspective, the negative effect on life satisfaction of an increase in unemployment from the lowest value in the sample (3.7 percent in Baden-Wuerttemberg in 1991) to the highest value (around 20.2 percent in Berlin in 2003) is 0.60 points for people working in the private sector—similar to the negative effect of becoming personally unemployed (see Stutzer and Frey 2004).

In sum, the results show that general unemployment mainly affects employees in the private sector and less so those in the public sector.[12] In the public sector, public servants are the least affected. This is the group that enjoys the strictest dismissal protection. This finding suggests that economic insecurity is an important reason for the reduced individual welfare that occurs in an economic downturn. The different specifications show that treating the dependent variable ordinally or cardinally leads to almost identical results. Adding individual control variables, like wages or working hours, and individual fixed effects affects the direct effect of working in the public sector somewhat. This reflects that individual-specific differences across sectors are correlated with reported subjective well-being. However, controlling for personal characteristics and time-invariant heterogeneity does not affect our main result that public sector workers' life satisfaction is much less affected by general unemployment than that of workers in the private sector. While we find no effect of regional unemployment for all public sector employees in models that do not control for individual heterogeneity, in models with individual fixed-effects this effect completely vanishes only for public servants. The following section further tests the robustness of this result with regard to a number of alternative explanations based on sample selection and self-selection into the public sector. In light of the above findings, we estimate both ordered probit regressions without fixed-effects and OLS regressions with fixed-effects.

C. Robustness Tests

This section analyzes the sensitivity of our results with regard to alternative samples and sector-specific heterogeneity in individual characteristics. The available panel data allows a number of selection issues to be dealt with by including individual, time-invariant fixed effects. However, this only holds for levels but may not hold for interaction effects. When calculating sector-specific effects of regional unemployment (that is, interaction terms), sector-specific individual differences may affect the results over and above sector differences in economic security. This might lead to a misattribution bias. The respective individual characteristics can be time-invariant like risk preferences or time-variant like tenure.

12. The result with regard to the relative weight of general and job-related consequences of unemployment on workers' life satisfaction holds if the lagged rate of regional unemployment is included rather than the contemporaneous. The estimation results are available on request.

1. Sample Selection

In order to be included in the sample, individuals have to work either part-time or full-time in either the public sector or the private sector. Thereby, employment status and sector are determined on an annual basis. Individuals are included independent of their citizenship and whether they are self-employed or not. These sample restrictions might be important for our results for at least three reasons: First, since we include respondents that change their sector of employment or their public servant status, one might worry that the composition of respondents in these two sectors changes over the business cycle in a way that interferes with estimating and interpreting the coefficients of interest. For example, well-educated, happy people might hop into the public sector when the unemployment situation turns difficult in the private sector. Second, foreigners are underrepresented in the public sector and may be differently affected by unemployment for other reasons than job security. Third, self-employed people work exclusively in the private sector. Self-employed individuals may be differently affected by higher unemployment than other employees for a variety of reasons. On the one hand, they may not only fear the loss of their own job but also of their investments or they may suffer from having to dismiss their employees. On the other hand, they may feel less threatened by high general unemployment as they cannot be made redundant. We test the robustness of our findings with regard to the three criteria for sample selection.

Columns 1 and 2 in Table 3 test the robustness of the results in the previous section by focusing on individuals who never changed their sector and who never changed their state of residence over the investigated time period. We report results both from ordered probit estimations and OLS regressions with individual fixed effects. Obviously, in the fixed effects regression, the general effect of the employment sector can no longer be estimated. The results (summarized in the panel at the bottom of Table 3) show that private sector workers remain more affected by high unemployment than public sector workers (including public servants), whereby the effects are more pronounced than in the baseline regression (Columns 4 and 5 in Table 2).

Columns 3 and 4 in Table 3 present the results when excluding self-employed people from the sample. The results are robust to this change in the selection of the sample and very similar in magnitude to the baseline regressions.

Columns 5 and 6 in Table 3 show that the results also are qualitatively and quantitatively very similar if we focus on German citizens.

In sum, in all the models, tests on the joint significance of the interaction terms show that public sector workers' life satisfaction is significantly less affected by unemployment than the life satisfaction of private-sector workers. Moreover, the differential effects are comparable in magnitude to the ones estimated for the full sample.

2. Sector-Specific Heterogeneity in Individual Characteristics

Workers in the public sector might be considered a selection of people with specific characteristics. These characteristics might affect the differential reaction to the business cycle, and, accordingly, the effect attributed to sector-specific *institutional* differences (and thus to economic insecurity) might be either too large or too small.

Table 3
Robustness to sample selection

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
	Stayers only		Employed only		German citizens only	
Life satisfaction	Ordered Probit	OLS	Ordered Probit	OLS	Ordered Probit	OLS
Sector and position						
Private sector	Reference group					
Public sector	0.037 (0.023)		0.020 (0.017)	0.013 (0.030)	0.034(*) (0.019)	0.006 (0.032)
Public servant	0.037 (0.035)		0.053(*) (0.029)	−0.027 (0.076)	0.053(*) (0.030)	−0.040 (0.079)
Unemployment rate (UR)						
State unemployment rate	−0.021** (0.008)	−0.052** (0.014)	−0.023** (0.007)	−0.041** (0.012)	−0.023** (0.008)	−0.038** (0.013)
Interaction terms						
Public sector × UR	0.015(*) (0.008)	0.018 (0.015)	0.012* (0.006)	0.012 (0.009)	0.011(*) (0.007)	0.007 (0.009)
Public servant × UR	0.008 (0.012)	0.042* (0.021)	0.008 (0.010)	0.037* (0.015)	0.008 (0.010)	0.038* (0.015)
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes
State-specific effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-specific effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual-specific effects	No	Yes	No	Yes	No	Yes

F, Wald χ^2	1657.68**		27.65**		1784.56**		24.52**		1678.74**		24.17	
Pseudo R^2, R^2 within	0.012		0.032		0.011		0.029		0.012		0.033	
Number of observations	84,023		84,023		98,447		98,447		82,719		82,719	
Number of individuals	16,698		16,698		18,016		18,016		15,532		15,532	
Effect of unemployment for												
Private sector employees	−0.021**	(0.008)	−0.052**	(0.014)	−0.023**	(0.007)	−0.041**	(0.012)	−0.023**	(0.008)	−0.038**	(0.013)
Public sector employees	−0.006	(0.010)	−0.035*	(0.018)	−0.011	(0.008)	−0.029	(0.015)	−0.012	(0.009)	−0.031*	(0.014)
Public servants	0.002	(0.011)	0.008	(0.020)	−0.003	(0.010)	0.008	(0.017)	−0.004	(0.011)	0.006	(0.017)
Test for joint significance of interaction terms												
F, χ^2	8.10*		6.62**		8.61*		6.54**		6.27*		5.04**	

Notes: Robust standard errors in parentheses adjusted for clustering on the individual level. Personal characteristics as in Table 2.
Source: GSOEP 1984–2004.
Level of statistical significance: $^{(*)}$ $p < 0.1$ * $p < 0.05$, ** $p < 0.01$

Controlling for individual fixed effects is not sufficient when interaction effects are analyzed and interpreted. Two examples can illustrate the issue: First, public sector workers might be more risk-averse. This could lead to an underestimation of the estimated effect as private sector employees would suffer even more from high unemployment if they were as risk-averse as public sector employees. Second, however, public sector jobs also might be particularly desirable (especially in recessions). In the competition for these jobs, more able workers might be more likely to get them. These workers also might stay longer in their job, resulting in higher labor force attachment as evidenced in higher tenure in the public sector. If the more able individuals also are better at dealing with perceived economic threats, the differential effects might be overestimated. In this latter case, ability and not differences in economic security across sectors would drive our results.

In our robustness analysis, we specifically take into account the level of education, tenure, previous unemployment experience and risk preferences as factors of sector-specific heterogeneity that might interact with the welfare costs of general unemployment.

Tables 4 and 5 show the results for ordered probit estimations and OLS regressions with individual fixed effects.

Columns 1 and 2 in Table 4 report the effect of interacting the variable for education with the unemployment rate. Better-educated workers might, for example, be better able to handle risk and thus be less affected by high general unemployment. As the public sector attracts better-educated workers, an interaction effect between education and the rate of unemployment could lower the estimated interaction effect of the rate of unemployment and working in the public sector. The results, however, do not support the alternative explanation that public-sector workers are hurt less by general unemployment rates because they are, on average, better educated. The point estimates for the effect of unemployment on the three groups of workers are virtually unchanged. With regard to the attenuating effect of education, the results are inconclusive. While we find no attenuating effect in the ordered probit regression, the OLS fixed-effect regression indeed suggests that better educated individuals suffer less from higher regional unemployment.

Columns 3 and 4 test whether differences in tenure can explain the milder effect of general unemployment on people working in the public sector. We add a variable for tenure and an interaction term between tenure and the rate of unemployment. Workers in the public sector have longer tenure and as such stronger labor force attachment. If tenure influences job security, workers with longer tenure might be less affected by high unemployment rates. The differences in the welfare costs of unemployment between the public and the private sector might then be caused by tenure and not by the sector of employment directly. The results again show that the point estimations for the differential effects of general unemployment on private and public workers' life satisfaction are hardly affected. The interaction terms of public sector and public servants with the rate of unemployment are still jointly statistically significant ($p < 0.05$ and $p < 0.01$, respectively). No moderating effect of tenure with regard to the well-being consequences of general unemployment is measured.

The estimations in Columns 5 and 6 test whether differences in unemployment histories can explain the differential reaction of public and private sector workers to

Table 4
Robustness to sector-specific heterogeneity in individual characteristics

Dependent variable	(1) Level of education		(2) Level of education		(3) Tenure		(4) Tenure		(5) Unemployment history		(6) Unemployment history	
Life satisfaction	Ordered Probit		OLS		Ordered Probit		OLS		Ordered Probit		OLS	
Sector and position												
Private sector	Reference group											
Public sector	0.019	(0.017)	0.011	(0.030)	0.017	(0.017)	0.008	(0.030)	0.018	(0.017)	0.008	(0.030)
Public servant	0.051(*)	(0.029)	−0.061	(0.077)	0.035	(0.030)	−0.054	(0.079)	0.044	(0.030)	−0.029	(0.077)
Unemployment rate (UR)												
State unemployment rate	−0.021**	(0.007)	−0.036**	(0.012)	−0.021**	(0.007)	−0.036**	(0.012)	−0.021**	(0.007)	−0.036**	(0.012)
Interaction terms												
Public sector × UR	0.014*	(0.006)	0.011	(0.009)	0.013*	(0.006)	0.014	(0.009)	0.015*	(0.006)	0.013	(0.009)
Public servant × UR	0.007	(0.010)	0.028(*)	(0.016)	0.008	(0.010)	0.033*	(0.015)	0.007	(0.010)	0.033*	(0.015)
Ln(years of education) × UR	−4E-4	(0.011)	0.035(*)	(0.020)								
Tenure × UR					−1E-4	(2E-4)	2E-5	(4E-4)				
Unemployment history × UR									0.033	(0.022)	0.046	(0.048)
Ln(years of education)	0.062(*)	(0.037)	0.014	(0.122)	0.075*	(0.037)	0.021	(0.122)	0.060	(0.037)	0.027	(0.123)
Tenure					0.003**	(0.001)	−0.002	(0.002)				
Unemployment history									−0.485**	(0.061)	0.218	(0.153)
Personal characteristics	Yes		Yes		Yes		Yes		Yes		Yes	
State-specific effects	Yes		Yes		Yes		Yes		Yes		Yes	
Year-specific effects	Yes		Yes		Yes		Yes		Yes		Yes	
Individual-specific effects	No		Yes		No		Yes		No		Yes	

(continued)

Table 4 *(continued)*

Dependent variable	(1) Level of education		(2) Level of education		(3) Tenure		(4) Tenure		(5) Unemployment history		(6) Unemployment history	
Life satisfaction	Ordered Probit		OLS		Ordered Probit		OLS		Ordered Probit		OLS	
F, Wald χ^2	1991.06**		26.36**		1980.61**		26.29**		1992.6**		25.74**	
Pseudo R^2, R^2 within F, Wald χ^2	0.012		0.0309		0.0121		0.0309		0.0124		0.0309	
Number of observations	104,258		104,258		103,195		103,195		102,465		102,465	
Number of individuals	19,022		19,022		18,912		18,912		17,886		17,886	
Effect of unemployment for												
Private sector employees	−0.021**	(0.007)	−0.036**	(0.012)	−0.021**	(0.007)	−0.036**	(0.012)	−0.021**	(0.007)	−0.036**	(0.012)
Public sector employees	−0.008	(0.008)	−0.026(*)	(0.014)	−0.008	(0.008)	−0.022	(0.014)	−0.007	(0.008)	−0.023	(0.014)
Public servants	−2E-4	(0.011)	0.002	(0.018)	−4E-4	(0.010)	0.011	(0.017)	5E-4	(0.010)	0.010	(0.017)
Test for joint significance of interaction terms												
F, χ^2	9.32**		3.85*		9.05*		6.06**		10.81**		6.00**	

Notes: Robust standard errors in parentheses adjusted for clustering on the individual level. Personal characteristics as in Table 2.
Source: GSOEP 1984–2004.
Level of statistical significance: (*) $p < 0.1$ * $p < 0.05$, ** $p < 0.01$

Table 5
Robustness to heterogeneity in risk preferences

Dependent variable	(1) Risk preferences		(2) Risk preferences	
Life satisfaction	Ordered Probit		OLS	
Sector and position				
Private sector	Reference group			
Public sector	0.031	(0.022)	0.046	(0.034)
Public servant	0.046	(0.036)	−0.076	(0.093)
Unemployment rate (UR)				
State unemployment rate	−0.025*	(0.010)	−0.039**	(0.015)
Interaction terms				
Public sector × UR	0.016*	(0.007)	0.011	(0.011)
Public servant × UR	0.007	(0.012)	0.026	(0.018)
Risk preferences × UR	0.001	(0.001)	−0.002	(0.002)
Risk preferences	0.013**	(0.004)		
Individual characteristics	Yes		Yes	
State-specific effects	Yes		Yes	
Year-specific effects	Yes		Yes	
Individual-specific effects	No		Yes	
F, Wald χ^2	1,485.640**		20.840**	
Pseudo R^2, R^2 within	0.014		0.034	
Number of observations	69,324		69,324	
Number of individuals	10,441		10,441	
Effect of unemployment for				
Private sector employees	−0.025*	(0.010)	−0.039**	(0.015)
Public sector employees	−0.009	(0.011)	−0.028	(0.018)
Public servants	−0.001	(0.014)	−0.002	(0.020)
Test for joint significnce of interaction terms				
F, χ^2	8.08*		2.81(*)	

Notes: Robust standard errors in parentheses adjusted for clustering on the individual level. Personal characteristics as in Table 2.
Source: GSOEP 1984–2004.
Level of statistical significance: $^{(*)}$ $p < 0.1$ * $p < 0.05$, ** $p < 0.01$

high general unemployment rates. Past unemployment spells affect individuals for a long time. On the one hand, one might hypothesize that feelings of economic insecurity depressing life satisfaction are more likely for individuals who have had a prior experience of a negative event involving personal unemployment. On the

other hand, however, as shown by Clark, Georgellis and Sanfey (2001) individuals who experienced unemployment in the past are psychically less affected by another unemployment spell than individuals who have never or rarely experienced unemployment in the past. As public sector workers, on average, are less hit by personal unemployment, their life satisfaction can either be less or more affected by the prospect of potential future unemployment. In order to test whether differences in unemployment histories bias our main results, we interact an individual's unemployment history from the age of 15 with the rate of unemployment. The results again show that this additional interaction effect does not affect the result that public sector workers' subjective well-being is less affected by high unemployment rates.[13] With regard to the unemployment history, it seems, though not statistically significant, that people with past experience of unemployment suffer more when general unemployment increases.

Finally, the estimations in Table 5 test whether differences in risk preferences between the two sectors explain part of the differential reaction to high unemployment. Public sector workers in Germany have been reported to be more risk-averse than private sector workers (see Bonin et al. 2007; Pfeifer 2008). We find the same in our sample for public sector workers in total (based on a measure of risk aversion previously validated with choice experiments, see Appendix 1 for details). However, public servants report to be slightly more willing to take risks than the average employee in the private sector according to this measure (see Table 1). To see how the distribution of risk preferences affects our results, we add the risk-aversion measure in our estimation equation. Please note that the risk-preference parameter was measured only in 2004 and, as such, it is captured by the individual fixed effects in the OLS regressions. In order to take into account sectoral differences in risk preferences, we interact the measure with the rate of unemployment. While preferences for risk taking are positively correlated with life satisfaction, it seems not to be the case that generally more risk-averse individuals react differently to high unemployment rates. Most importantly, the differential effect of general unemployment on workers in the private and public sector is not economically significantly affected.[14]

In sum, this section shows that our results to a series of tests for sample selection and self-selection into the two sectors are robust. The result that individuals employed in the public sector suffer less from general unemployment than workers in the private sector seems not to be explained by sector-specific heterogeneity in individual characteristics and past experiences. This lends support to our hypothesis that economic insecurity is an important reason for the reduced subjective well-being of workers during periods of high unemployment.

13. The result does not depend on a particular definition of the unemployment history variable. In accordance with Clark, Georgellis, and Sanfey (2001), we also define a variable capturing the unemployment experience in the three years preceding the interview. Using this alternative definition of unemployment history yields very similar results to the ones reported in Table 4; they are available on request.

14. Risk preferences are not necessarily time-invariant and may change with life events such as the birth of a first child and becoming a parent. There is no a priori reason to assume that the frequency and timing of such life events differ across sectors in a way that would bias our estimates. If we add a variable that takes the value 1 in the year a respondent's first child was born and all years thereafter and zero otherwise and interact it with the mean unemployment rate, the results hold. They are available on request.

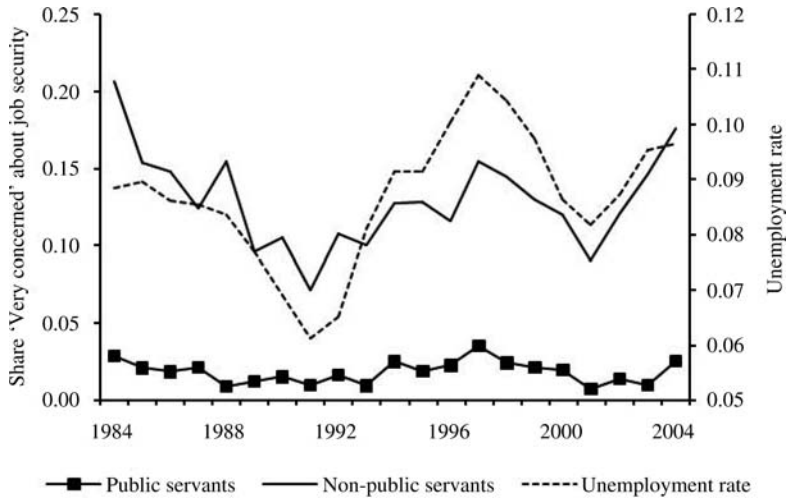

Figure 4

Sectoral Differences in Perceived Job Security in West Germany

Notes: Share of workers reporting to be "very concerned" about job security in West Germany.

Source: GSOEP 1984–2004 and Federal Statistical Office Germany.

D. Sectoral Differences in Perceived Economic Insecurity

So far, the cost in subjective well-being due to general unemployment and the relative importance of general negative effects of unemployment and of effects on economic security are inferred from an *a priori* institutional distinction. This section analyzes whether there is direct evidence that people's *perceived* job security and their worries about their own economic situation depend on the rate of unemployment. The validity of the institutional distinction is studied by estimating separate partial correlations for workers in the private and the public sectors. The subjective measures are based on two questions in the GSOEP: "What is your attitude toward the following areas—are you concerned? (1) *Your job security?* and (2) *Your own economic situation?*" Respondents answer on a three-point scale: 1 "not concerned at all," 2 "somewhat concerned," and 3 "very concerned." On average, workers in the sample report concerns about job security at a level of 1.592 points, and concerns about their own economic situation at a level of 1.838 points.

Figure 4 shows the proportion of people who are "very concerned" about job security (left axis) and the average regional rate of unemployment (right axis) for West Germany between 1984 and 2004. Two patterns are worth mentioning: First, the level of perceived job security differs sharply between public servants and nonpublic servants. While, on average, 13 percent of nonpublic servants are "very concerned" about their job security, only 2 percent of public servants are so. Second, perceived job security correlates more with the rate of unemployment for nonpublic servants than for public servants. Thus, the figure illustrates that the institutionalized

sectoral differences in job security also are reflected in people's perceived job security.

Table 6 quantifies the effect of general unemployment on individuals' perceptions of their job security and their own economic situations, distinguishing between private sector and two categories of public sector workers. The dependent variables are based on three-point scales. Higher values indicate more concern over job security and own economic situation. The same control variables as in Table 2 are included. For each dependent variable, results of one ordered probit estimation and one OLS estimation with individual fixed-effects are reported.

The regressions support the general impression from Figure 4 and the proposed interpretation of the private/public life satisfaction gap pursued throughout the paper. Higher unemployment does increase worries about both job security and own economic situation for individuals working in the private sector. The effect is larger on job security than on own economic situation. Consistent with the institutional difference in the exposure to economic threats, people in the public sector and, in particular, public servants, worry less than other workers about job security and their own economic situation (evaluated at the mean level of unemployment). Moreover, the concerns of public servants over job security and own economic situation barely change when unemployment rates increase. While the average concerns of private sector workers about their jobs increase by about 0.04 points when general unemployment is one percentage point higher (OLS within estimation), there is no clear negative effect for public servants. For concerns about their economic situations, partial correlations with unemployment of 0.028 for private sector workers, 0.021 for lower-level public sector workers, and zero for public servants are estimated (OLS within estimation). To put these findings in words, higher levels of unemployment have a smaller effect on perceived job security and worries about own economic situation for people working in the public sector than for others. The results show that public servants in particular, who are shielded the most from economic shocks, do not worry about job security—or at least do so independently of the level of unemployment.

V. Empirical Analysis for the United States and the European Union

In order to test whether the findings for West Germany are country-specific, we replicate the analysis for the United States and for the member countries of the European Union. The results for the United States and the European Union are qualitatively similar to the results for Germany. However, the two data sets have clear limitations compared with the GSOEP and the differential effect of unemployment is less precisely estimated than in the analysis for Germany.

A. Results for the United States

For the United States, we study the predicted differential reaction of public and private sector workers to general unemployment with data from the General Social Survey (GSS).

Table 6
Unemployment and worries about job security and own economic situation

Dependent variable	(1) Job security	(2)	(3) Own economic situation	(4)
	Ord. probit	OLS	Ord. probit	OLS
Sector and position				
Private sector	Reference group			
Public sector	−0.311**	−0.060**	−0.102**	0.014
	(0.019)	(0.014)	(0.018)	(0.012)
Public servant	−0.805**	−0.146**	−0.389**	−0.044
	(0.039)	(0.035)	(0.033)	(0.032)
Unemployment rate (UR)				
State unemployment rate	0.061**	0.043**	0.036**	0.028**
	(0.007)	(0.005)	(0.007)	(0.004)
Interaction terms				
Public sector × UR	0.002	−0.008*	−0.001	−0.007*
	(0.007)	(0.004)	(0.006)	(0.003)
Public servant × UR	−0.042**	−0.041**	−0.028*	−0.021**
	(0.013)	(0.005)	(0.011)	(0.005)
Individual characteristics	Yes	Yes	Yes	Yes
State-specific effects	Yes	Yes	Yes	Yes
Year-specific effects	Yes	Yes	Yes	Yes
Individual-specific effects	No	Yes	No	Yes
Wald χ^2, F	5297.09**	39.47**	5231.00**	42.77**
Pseudo R^2, R^2 within	0.075	0.034	0.066	0.034
Number of observations	104,258	104,258	104,010	104,010
Number of individuals	19,022	19,022	19,004	19,004
Effect of unemployment for ...				
... private sector employees	0.061**	0.043**	0.036**	0.028**
	(0.007)	(0.005)	(0.007)	(0.004)
... public sector employees	0.063**	0.035**	0.036**	0.021**
	(0.009)	(0.006)	(0.008)	(0.005)
... public servants	0.022	−0.006	0.008	−1.1E-4
	(0.013)	(0.006)	(0.011)	(0.006)
Test for joint significance of interaction terms				
χ^2, F	10.79**	52.18**	8.06*	15.98**

Notes: Robust standard errors in parentheses adjusted for clustering on the individual level. Personal characteristics as in Table 2.
Source: GSOEP 1984–2004.
Level of statistical significance: $^{(*)}$ $p < 0.1$ * $p < 0.05$, ** $p < 0.01$

1. Data

The GSS is a repeated cross-section data set. We use the waves from 1976 to 2002 and restrict the sample to individuals working part-time or full-time. This leaves 17,534 observations for which the relevant information is available. Public sector workers are defined according to industry codes. According to this definition, 1,342 individuals in the sample work in the public sector and 16,192 work in the private sector.

Our dependent variable is respondents' happiness, which is elicited on a three-point scale. Data for the rate of unemployment at the state level are from the Bureau of Labor Statistics. Details about the data, sample selection, variable descriptions and summary statistics can be found in Appendix 1 and Table A3 in Appendix 2.

2. Results

According to the estimates reported in Table 7, regional unemployment (mean adjusted) has a negative effect on the happiness of private sector employees (Column 1), but it has no clear negative effect on the happiness of public bureaucrats. If anything, the partial correlation is positive; however, it is statistically imprecisely measured. Column 3 studies the differential effect of state level unemployment in one equation. If estimating marginal effects from the ordered probit regression, the results show that if unemployment rates increase by one percentage point, the proportion of working people stating that they are "very happy" decreases by 0.5 percentage points. For people working in the public administration, an increase in general unemployment has a marginal effect of $+1.7$ percentage points on happiness (however estimated with a large standard error). These findings suggest that, in the United States, too, general effects of high unemployment on society play a minor role compared with the effect of the increased insecurity for private sector employees.

B. Results for the European Union

For member countries of the European Union, the differential impact of general unemployment on life satisfaction is studied with data from the Eurobarometer (EB).

1. Data

The EB is a repeated cross-section survey. Our analysis includes 13 European countries for the years 1989 to 1994, since those are the only years for which information is available on people's life satisfaction and on the sector in which they work. The analysis includes 50,262 working individuals with nonmissing variables. People working in the public administration and nationalized industries are defined as public sector. This leaves us with 20,787 people working in the public sector and 29,475 working in the private sector. Our dependent variable is life satisfaction reported on a four-point scale. Data on national rates of unemployment are from the OECD. For details about the data, sample selection, variable descriptions, and summary statistics, see Appendix 1 and Table A4 in the Appendix 2.

Table 7
Unemployment and sectoral differences in happiness in the United States, 1976–2002

Dependent variable Happiness (three-point scale)	(1) Private sector		(2) Public sector		(3) All	
State unemployment rate (UR)	−0.015(*)	(0.008)	0.047	(0.035)	−0.012	(0.008)
Private sector	Reference group					
Public sector					0.021	(0.034)
Interaction: UR × public sector					0.025	(0.018)
Female	0.084**	(0.019)	−0.017	(0.067)	0.078**	(0.018)
Age	−0.037**	(0.007)	−0.029	(0.023)	−0.037**	(0.006)
(Age squared)/100	0.045**	(0.008)	0.029	(0.028)	0.044**	(0.008)
White	0.207**	(0.030)	0.057	(0.086)	0.193**	(0.029)
Number of children						
0	Reference group					
1	−0.091**	(0.031)	−0.140	(0.119)	−0.095**	(0.030)
2	−0.042	(0.034)	0.008	(0.120)	−0.038	(0.033)
≥ 3	−0.055	(0.037)	0.007	(0.137)	−0.055	(0.036)
Working part-time	−0.050(*)	(0.026)	−0.162	(0.147)	−0.052*	(0.025)
Income quartile						
First	Reference group					
Second	0.113**	(0.029)	−0.054	(0.147)	0.109**	(0.029)
Third	0.240**	(0.031)	0.940*	(0.141)	0.241**	(0.031)
Fourth	0.380**	(0.034)	0.508**	(0.152)	0.390**	(0.033)
(Household size)$^{1/2}$	−0.020	(0.029)	−0.145	(0.101)	−0.027	(0.028)

(continued)

Table 7 *(continued)*

Dependent variable Happiness (three-point scale)	(1) Private sector		(2) Public sector		(3) All	
Education:						
Less than high school	Reference group					
High school	0.033	(0.030)	0.135	(0.165)	0.036	(0.030)
Associate/junior college	0.075(*)	(0.044)	0.326(*)	(0.183)	0.085(*)	(0.044)
Bachelor's	0.135**	(0.037)	0.214	(0.173)	0.135**	(0.036)
Graduate	0.179**	(0.043)	0.058	(0.199)	0.166**	(0.041)
Marital status						
Married	Reference group					
Widowed	−0.453**	(0.625)	−0.568**	(0.193)	−0.458**	(0.059)
Divorced	−0.434**	(0.030)	−0.499**	(0.118)	−0.435**	(0.030)
Separated	−0.536**	(0.053)	−0.413*	(0.183)	−0.531**	(0.051)
Never married	−0.383**	(0.031)	−0.301**	(0.114)	−0.380**	(0.030)
Size of town/city (12 dummies)	Yes		Yes		Yes	
State fixed effects	Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes	
Number of observations	16,192		1,342		17,534	
Pseudo R^2	0.0436		0.0721		0.0430	
Wald χ^2	1360.37		207.14		1486.03	

Notes: Ordered probit estimations. Robust standard errors in parentheses adjusted for clustering on state-year level.
Source: GSS 1976–2002.
Level of statistical significance: $^{(*)}$ $p < 0.1$ * $p < 0.05$, ** $p < 0.01$

Table 8
Unemployment and sectoral differences in life satisfaction in 13 European countries, 1989–94

Dependent variable Life satisfaction (four-point scale)	(1) Private sector		(2) Public sector		(3) All	
Unemployment rate (UR)	−0.025*	(0.012)	0.012	(0.019)	−0.012	(0.013)
Private sector	Reference group					
Public sector					0.035*	(0.021)
Interaction: UR × Public sector					0.007(*)	(0.004)
Female	0.077**	(0.014)	0.049*	(0.022)	0.063**	(0.015)
Age	−0.039**	(0.005)	−0.047**	(0.004)	−0.042**	(0.004)
(Age squared)/100	0.044**	(0.006)	0.055**	(0.005)	0.048**	(0.005)
Ln(income)	0.326**	(0.027)	0.331**	(0.052)	0.334**	(0.036)
Top income category (=1)	0.090**	(0.022)	0.105**	(0.029)	0.095**	(0.019)
Marital status						
Single	Reference group					
Married	0.098**	(0.024)	0.125**	(0.036)	0.106**	(0.024)
Living together	0.018	(0.034)	0.009	(0.035)	−0.011	(0.029)
Separated	−0.355**	(0.054)	−0.313**	(0.069)	−0.340**	(0.042)
Divorced	−0.209**	(0.036)	−0.168**	(0.040)	−0.192**	(0.029)
Widowed	−0.099(*)	(0.059)	−0.056	(0.056)	−0.079(*)	(0.043)

(continued)

Table 8 *(continued)*

Dependent variable Life satisfaction (four-point scale)	(1) Private sector		(2) Public sector		(3) All	
Education to age						
<15 years old	Reference group					
15–19 years old	0.031(*)	(0.017)	0.055(*)	(0.028)	0.039*	(0.016)
>19 years old	0.099**	(0.024)	0.092**	(0.034)	0.092**	(0.023)
Still in education	0.092	(0.080)	0.090	(0.112)	0.091	(0.070)
Living area						
Rural region	Reference group					
Small town	−0.083**	(0.017)	−0.057**	(0.018)	−0.071**	(0.013)
Big town	−0.154**	(0.021)	−0.158**	(0.024)	−0.155**	(0.015)
Year dummies (6)	Yes		Yes		Yes	
Country dummies (13)	Yes		Yes		Yes	
Number of observations	29,475		20,787		50,262	
R^2	0.112		0.114		0.112	
χ^2	7673.4**		4112.8**		8849.5**	

Notes: Ordered probit estimations. Robust standard errors in parentheses adjusted for clustering on country-year level.
Source: EB 1989–94.
Level of statistical significance: (*) $p < 0.1$ * $p < 0.05$, ** $p < 0.01$

2. Results

Qualitatively the results for the 13 European countries, reported in Table 8, are very similar to those observed for West Germany and the United States. While there is a statistically significant negative partial correlation between the national rate of unemployment for private sector workers (Column 1), there is no such correlation for public sector workers (Column 2). However, the quantitative results for Europe depend on the specification. In Column 3, smaller effects of national unemployment on workers' life satisfaction are estimated than those reported in Columns 1 and 2.[15] Still, there is a clear indication that people in the private sector are more negatively affected by unemployment than are people working in the public sector. For the former, an increase in the general unemployment rate of one percentage point affects the probability of being either fairly or very satisfied by -0.5 percentage points. The respective effect for public sector employees is 0.2 percentage points. Again, general unemployment hurts those who benefit from the protection of public employment much less, suggesting that increased economic risks in the private sector rather than general negative effects are the main channel through which unemployment affects life satisfaction.

V. Concluding Remarks

This paper explores the importance of possible reasons that explain why people's life satisfaction decreases when the unemployment rate increases. High unemployment rates may influence life satisfaction either via the general external effects this has on society or via the effect this has on people's sense of economic insecurity; in particular, with regard to their jobs. Our empirical strategy exploits institutional differences in the exposure to economic shocks. We focus on the private and the public sectors. Employees in the public sector are often at least partly shielded by stricter dismissal protection than their colleagues in the private sector, and need not fear the bankruptcy of their organization.

The results show that people working in the public sector are much less affected by high levels of unemployment than are people working in the private sector. That is, life satisfaction of public sector workers is less sensitive to economic upheaval. This pattern is found by studying panel data for Germany (GSOEP), and the analysis is replicated using repeated cross-sectional data for the United States (GSS) and 13 European countries (EB). Overall, the negative effect of high unemployment on people's life satisfaction does not seem to be driven as much by negative general externalities of unemployment as by people's worries about economic distress, for example, as a result of losing their job. In the rich data set for Germany, the result holds up after controlling for other sectoral differences (for example, wages and working hours), demographic differences, and time-invariant unobservable individual heterogeneity. Moreover, sensitivity tests indicate that the finding is robust to

15. Note that coefficients cannot be compared directly across different models in ordered probit regressions since threshold values also are separately estimated. Here, comparisons are made for estimated marginal effects.

sectoral heterogeneity in individual characteristics and sectoral self-selection based on education, tenure, past unemployment experience, and general risk preferences. As people are not randomly assigned to sectors, the possibility of biased results arising from the selection based on unobservables—that may even change over time—remains.

While the empirical approach taken here allows an analysis of the distribution of the costs from an increase in general unemployment, it leaves open a number of closely related issues. First, little is known about the institutions that determine the vulnerability of the economy to shocks in terms of life satisfaction. Future research might extend the scarce but interesting findings in this area. In a longitudinal sample of the European Union, more generous unemployment benefits are found to correlate positively with subjective well-being in the general population (Di Tella, MacCulloch, and Oswald 2003). Based on the same data from EB, the negative effects of individual and general unemployment on reported life satisfaction are found to be larger in countries with low job protection (Becchetti, Castriota, and Giuntella 2006).

Second, based on the evidence presented, no conclusion can be drawn as to whether job protection should be increased. While increased job protection might benefit insiders (see, for example, Clark and Postel-Vinay 2009), it is also likely to make employers more reluctant to hire new workers, leading to longer individual unemployment spells and to higher general unemployment.

In sum, we conclude that anticipatory feelings from economic insecurity matter for individual welfare. These welfare costs are largely neglected in the traditional economic analysis as well as in the evaluation of social security programs that focus on moral hazard and liquidity constraints or consumption smoothing. Moreover, the consequences in terms of reduced subjective well-being in the private sector might be of further importance if there is a strong relationship between life satisfaction, job specific investments, and productivity.

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Appendix 1

Data

German Socioeconomic Panel (GSEOP)

The GSEOP is a representative longitudinal study of private households in Germany. We use observations from West Germany for the first 21 waves (1984–2004). The data used in this paper was extracted from the SOEP Database provided by the DIW Berlin (www.diw.de/soep) using the Add-On package SOEPMENU for Stata(R). SOEPMENU (www.soepmenu.de) was written by Dr. John P. Haisken-DeNew (john@soepmenu.de). See Haisken-DeNew (2005) for details. The SOEPMENU-generated DO file to retrieve the SOEP data used here is available from the authors on request. Any data or computational errors in this paper are ours.

Sample Selection

- *Age*: The sample is restricted to individuals who are older than 17 and younger than 66 of age, that is, those who are potentially active in the labor force.
- *Employed*: The sample considers only individuals who are either full-time or part-time employed, excluding individuals who are nonworking, unemployed, retired, in education, on maternity leave, etc. The sample includes both employed and self-employed individuals. The employment status is determined on a year-to-year basis allowing individuals to enter the sample before and after an absence from employment due to unemployment, maternity leave, further education etc. Of the 19,022 individuals in the sample, 978 changed at least once from part-time to full-time work, 973 at least once from full-time to part-time, and 17,583 never changed their employment arrangement.
- *Sector of employment*. The sector of employment is also determined on a year-to-year basis. Individuals who changed the sector during the sample period are included. Of the 19,022 individuals in the sample, 882 changed from the private to the public sector at least once (892 from the public to the private at least once). 17,669 of the observations in the sample are from people who never changed the sector during the sample period. (The numbers need not add up since the same individual can change sector repeatedly). Similarly, 173 changed the public servant status from nonpublic servant to public servant at least once (165 experienced a change in the other direction at least once), 18,775 never changed their public servant status.
- *Nonmissing control variables*: The sample is restricted to individuals with nonmissing control variables.

Definition of Variables

- *Life satisfaction*: "How satisfied are you with your life, all things considered?" Responses range on a scale from 0 "completely dissatisfied" to 10 "completely satisfied."
- *Concerns about job security*: "What is your attitude toward the following areas—are you concerned? Your job security?" Responses can be (1) "not concerned at all," (2) "somewhat concerned," and (3) "very concerned."
- *Concern about economic situation*: "What is your attitude toward the following areas—are you concerned? Your own economic situation?" Responses as above.
- *Ln(hourly income)*: Natural logarithm of net monthly income in real 2000 Euros divided by the monthly working hours. Incomes include all compensation including bonuses, etc.
- *Ln(household income)*: Natural logarithm of yearly net household income in real 2000 Euros.
- *Working hours*: Actual working hours per week.
- *Tenure*: Number of years at the present employer. The total number of observations containing information about tenure is 103,195.
- *Unemployment history*: Number of months a respondent was unemployed over the whole course of her or his observed career up to the point of the interview (that is, since age 15) relative the respondent's total employment history. Hence, the variable is defined as (# month unemployed since 15)/(# month full time employed since age 15 + # month full time employed since age 15 + # month part-time employed since age 15).
- *Risk preferences*: "How willing are you to take risks in general? Answers range from 0 "unwilling" to 10 "fully prepared." Measured only in 2004 and assigned to all years. Dohmen et al. (2005) validated this risk measure with incentive compatible choice experiments.
- *Unemployment rate*: Measured on the level of the Bundesland. Data is from Federal Statistical Office Germany. In the GSOEP, the two Laender, Rheinland-Pfalz, and Saarland, are coded as one. Accordingly, we take the average unemployment rate of the two Laender weighted by their populations as of 1994.

General Social Survey (GSS)

The GSS is a repeated cross-section survey conducted face-to-face with an in-person interview of a randomly-selected sample of adults (older than 18). The survey was conducted every year from 1972 to 1994 (except in 1979, 1981, and 1992). Since 1994, it has been conducted every other year. We use the waves between 1976–2002. See Table A3 in the Appendix 2 for summary statistics.

Sample Selection

- *Age*: The sample is restricted to individuals who are older than 18 and younger than 66 of age.
- *Employment*: The sample is restricted to individuals working full- or part-time.

Definition of Variables

- *Happiness*: "Taken all together, how would you say things are these days—would you say that you are very happy, pretty happy, or not too happy?" Answers on a three-point scale.
- *Public administration*: The sector of employment is defined based on individual's industry code. The following ISCO codes are included in public administration: 907, 917, 927, 937, 960–965, and 590 (for the 1970 Industry codes); 900, 901, 910, 921, 922, 930–932, 412–414, 416–418, 423, and 431 (for the 1980 Industry codes).

Eurobarometer (EB)

The EB is a yearly repeated cross-country survey. We use the waves from 1989 until 1994 since they include information about life satisfaction and the sector of employment. The 13 countries included are Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, and the United Kingdom. See Table A4 in the Appendix 2 for summary statistics.

Sample Selection

- *Age*: The sample is restricted to individuals who are older than 18 and younger than 66 of age.
- *Employment*: The sample is restricted to individuals who are working.

Definition of Variables

- *Life satisfaction*: "On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead?" Answers on a four-point scale.
- *Public sector*: Individuals who are either working in the public administration or in nationalized industries are coded as public sector.
- *Income*: In the EB, income is reported in income classes, whereby the number and definition of income classes differs across countries and waves. The original information has, therefore, been translated into a number representing the midpoint of the respective class interval and converted into 2000 Euros. The variable "top income category" controls for the open-ended highest income category.

Table A1
Robustness to alternative clustering

	(1)		(2)		(3)		(4)	
	Clustered on state-year level				Clustered on state level			
Dependent Variable Life satisfaction	Ord. Probit		OLS		Ord. Probit		OLS	
Sector and position								
Private sector (=1)	Reference group							
Public sector (=1)	0.019*	(0.009)	0.010	(0.025)	0.019	(0.012)	0.010	(0.019)
Public servant (=1)	0.051**	(0.013)	−0.061	(0.067)	0.051	(0.033)	−0.061	(0.049)
Unemployment rate (UR)								
State unemployment rate	−0.021**	(0.005)	−0.036**	(0.010)	−0.021*	(0.010)	−0.036(*)	(0.017)
Interaction terms								
Public sector × UR	0.014**	(0.003)	0.012(*)	(0.007)	0.014**	(0.002)	0.012	(0.009)
Public servant × UR	0.007(*)	(0.004)	0.034**	(0.012)	0.007	(0.007)	0.034*	(0.014)
Individual characteristics	Yes		Yes		Yes		Yes	
State-specific effects	Yes		Yes		Yes		Yes	
Year-specific effects	Yes		Yes		Yes		Yes	
Individual-specific effects	No		Yes		No		Yes	

Wald χ^2, F	4,949.82**	56.51**	849.49**	4.34*
Pseudo R^2, R^2 within	0.012	0.031	0.012	0.031
Number of observations	104,258	104,258	104,258	104,258
Number of clusters	210	210	10	10
Effect of unemployment for				
Private sector employees	−0.021** (0.005)	−0.036** (0.010)	−0.021* (0.010)	−0.036(*) (0.017)
Public sector employees	−0.008 (0.005)	−0.025* (0.011)	−0.008 (0.009)	−0.025 (0.019)
Public servants	−3E-4 (0.006)	0.009 (0.014)	−3E-4 (0.014)	0.009 (0.019)
Test for joint significance of interaction terms				
χ^2, F	36.76**	7.43**	91.72**	4.25(*)

Notes: Robust standard errors adjusted for clustering in parentheses on the state-year level (Columns 1 and 2) and on the state level (Columns 3 and 4). Personal characteristics as in Table 2.
Source: GSOEP 1984–2004.
Level of statistical significance: (*) $p < 0.1$ * $p < 0.05$, ** $p < 0.01$

Table A2
Baseline regressions with all control variables

Dependent variable Life satisfaction	(1) OLS		(2) Ord. Probit		(3) OLS		(4) Ord. Probit		(5) FE OLS		(6) FE POLS	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Sector and position												
Private sector (=1)	Reference group											
Public sector (=1)	0.033	0.027	0.023	0.017	0.026	0.027	0.019	0.017	0.010	0.030	0.005	0.018
Public servant (=1)	0.246**	0.044	0.150**	0.028	0.067	0.044	0.051(*)	0.029	−0.061	0.077	−0.027	0.046
Unemployment rate (UR)												
State unemployment rate	−0.032**	0.011	−0.022**	0.007	−0.031**	0.011	−0.021**	0.007	−0.036**	0.012	−0.023**	0.007
Interaction terms												
Public sector × UR	0.025**	0.009	0.015**	0.006	0.021*	0.009	0.014*	0.006	0.012	0.009	0.007	0.005
Public servant × UR	0.017	0.015	0.010	0.010	0.014	0.015	0.007	0.010	0.034*	0.015	0.019*	0.009
Personal characteristics												
Ln(hourly income)					0.255**	0.024	0.155**	0.016	0.258**	0.025	0.141**	0.015
Ln(HH income)					0.370**	0.024	0.232**	0.015	0.218**	0.024	0.129**	0.014
Actual working hours					0.016**	0.003	0.008**	0.002	0.027**	0.003	0.014**	0.002
(Actual working hours)^2					−2E-4**	4E-5	−1E-4**	2E-5	−3E-4**	3E-5	−2–4**	−2E-5
Working part-time					0.077*	0.038	0.037	0.024	0.028	0.034	0.006	0.020
Female					0.023	0.028	0.022	0.017				
Age 18–25								Reference group				
Age 26–30					−0.175**	0.027	−0.121**	0.018	−0.034	0.030	−0.033(*)	0.018
Age 31–35					−0.318**	0.033	−0.212**	0.021	−0.041	0.042	−0.034	0.025
Age 36–40					−0.368**	0.036	−0.244**	0.023	−0.009	0.052	−0.010	0.031
Age 41–45					−0.456**	0.038	−0.297**	0.024	−0.032	0.063	−0.017	0.037

Age 46–50			−0.491**	0.039	−0.318**	0.025	−0.055	0.075	−0.023	0.044
Age 51–55			−0.492**	0.041	−0.315**	0.027	−0.048	0.086	−0.014	0.051
Age 56–65			−0.390**	0.044	−0.244**	0.029	−0.005	0.099	0.019	0.058
Single						Reference group				
Married			0.171**	0.030	0.109**	0.020	0.110**	0.033	0.066**	0.020
Separated			−0.552**	0.064	−0.300**	0.037	−0.371**	0.062	−0.191**	0.034
Divorced			−0.145**	0.047	−0.083**	0.029	0.066	0.056	0.043	0.032
Widowed			−0.084	0.088	−0.045	0.055	−0.351**	0.134	−0.181*	0.071
(Household size)$^{1/2}$			−0.187**	0.039	−0.127**	0.025	−0.182**	0.042	−0.112**	0.024
Children in household			−0.005	0.025	−0.002	0.016	0.026	0.023	0.012	0.014
Head of household			−4.1E-4	0.025	−0.004	0.016	0.093*	0.041	0.064**	0.024
Ln(years of education)			0.135*	0.057	0.062(*)	0.037	0.022	0.121	0.035	0.070
EU citizen			0.279**	0.048	0.183**	0.031	−0.142	0.186	−0.084	0.108
German citizen			0.096**	0.036	0.051*	0.023	−0.002	0.088	−0.018	0.054
Partner unemployed			−0.364**	0.044	−0.223**	0.027	−0.192**	0.036	−0.111**	0.021
State-specific effects	Yes	Yes	Yes		Yes		Yes		Yes	
Year-specific effects	Yes	Yes	Yes		Yes		Yes		Yes	
Individual-specific effects	No	No	No		No		Yes		Yes	
F, Wald χ^2	19.56**	788.93**	33.54**		1990.73**		26.810**		31.100**	
R^2, Pseudo R^2, R^2 within	0.011	0.004	0.043		0.012		0.031		0.035	
Number of observations	104,258	104,258	104,258		104,258		104,258		104,258	
Number of clusters	19,022	19,022	19,022		19,022		19,022		19,022	

Notes: Robust standard errors adjusted for clustering on the individual level.
Source: GSOEP 1984–2004.
Level of statistical significance: $^{(*)}$ $p < 0.1$ * $p < 0.05$, ** $p < 0.01$

Table A3
Summary statistics (General Social Survey, 1976–2002)

	(1) Private sector	(2) Public sector	(3) Total
Happiness			
"Very happy"	30.97	32.04	31.05
"Pretty happy"	59.33	58.49	59.26
"Not too happy"	9.71	9.46	9.69
Female	49.41	38.15	48.55
Age	38.46 (11.55)	39.85 (11.29)	38.57 (11.53)
White	83.92	78.84	83.53
Number of children			
0	32.12	30.10	31.97
1	16.70	17.51	16.76
2	25.57	26.90	25.67
≥ 3	25.61	25.48	25.60
Working part-time	16.14	6.71	15.42
$(\text{Household size})^{1/2}$	2.84 (1.47)	2.72 (1.46)	2.83 (1.47)
Education			
Less than high school	13.12	5.89	12.56
High school	55.19	57.23	55.34
Associate/junior college	6.32	7.00	6.37
Bachelor's	17.27	21.16	17.57
Graduate	8.11	8.72	8.16
Marital status			
Married	56.45	58.35	56.59
Widowed	2.80	3.13	2.82
Divorced	14.44	15.95	14.55
Separated	3.69	3.73	3.70
Never married	22.62	18.85	22.33
Number of observations	16,192	1,342	17,534

Note: The table shows percentages, except for the continuous variables, Age and $(\text{Household size})^{1/2}$, for which the table shows means and standard errors in parentheses.

Table A4
Summary statistics (Eurobarometer 1989–94)

	(1) Private sector	(2) Public sector	(3) Total
Life satisfaction			
"Very satisfied"	28.33	29.43	28.79
"Fairly satisfied"	56.90	57.00	56.94
"Not very satisfied"	11.78	11.29	11.58
"Not at all satisfied"	2.99	2.28	2.69
Female	36.44	46.02	40.40
Age	36.33 (11.73)	39.03 (11.25)	37.45 (11.61)
Income	22,357.72 (11,875.7)	23,217.99 (12,001.08)	22,713.51 (11,935.12)
Top income category (=1)	17.92	20.49	18.98
Marital status			
Single	25.40	19.19	22.84
Married	59.86	66.12	62.45
Living together	7.72	6.22	7.10
Separated	1.36	1.40	1.38
Divorced	4.05	5.05	4.46
Widowed	1.60	2.02	1.78
Education to age			
<15 years old	25.95	16.66	22.11
15–19 years old	46.65	39.24	43.58
>19 years old	26.71	43.44	33.63
Still in education	0.69	0.66	0.68
Living area			
Rural region	34.09	31.59	33.05
Small town	36.78	38.53	37.51
Big town	29.13	29.88	29.44
Number of observations	29,475	20,787	50,262

Note: Table shows percentages, except for the continuous variables, Age and Income, for which the table shows means and standard errors in parentheses.