

Economic Shocks, Labor Market Institutions, and Workers' Well-Being

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Abstract

Individual welfare can be significantly negatively affected by economic shocks. Of particular relevance is the risk of unemployment. In this paper, we want to understand to what extent social insurance programs and regulations of the labor market are effective in dealing with economic shocks, i.e., in protecting people from suffering welfare losses. In order to assess the net effects of labor market institutions on individual welfare, we study panel data on reported subjective well-being for 13 European countries between 1975 and 2007. We link this data to OECD indicators on changes in the unemployment rate, the output gap, the generosity of unemployment benefits and on the employment protection legislation for regular and temporary work contracts. The former two indicators are our proxies for economic shocks. First results indicate that economic shocks are associated with lower life satisfaction, particularly so for unemployed individuals. We also find that more generous unemployment benefits increase the life satisfaction of unemployed people and mitigate the negative effect of an unemployment shock for employed people. The effects of employment protection depend on the propensity that workers have a regular or a temporary work contract. For people who are likely to work under a regular contract, regulations that make dissolving these contracts more difficult are associated with lower life satisfaction. In contrast, stricter regulations covering temporary workers are related to higher subjective well-being.

Keywords: Economic shocks, employment protection, labor market institutions, subjective well-being, unemployment, unemployment insurance

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1 Introduction

Individual welfare in terms of economic resources and subjective well-being can be significantly negatively affected by economic shocks. Of particular relevance is the risk of unemployment. Unemployment threatens people's material living standard as well as their psychic well-being in the short as well as in the long run. Individual vulnerability to the material and psychic costs of unemployment can only partially be privately insured. Most OECD countries have adopted social insurance programs and regulations of the labor market to deal with unemployment. Two key labor market policies stand out. First, unemployment insurance offers protection against the loss of income in case of job loss. Second, employment protection legislation intends to reduce the risk of losing one's job.

The focus of this paper is to understand whether social insurance programs and regulations of the labor market are effective in dealing with economic shocks, i.e. protecting people from suffering welfare losses. We distinguish between two central reasons for why labor market institutions might provide insurance. First, offering higher unemployment compensation in case of unemployment reduces the income gap between two labor market states. Generous unemployment insurance may therefore improve welfare as job seekers lose less. Second, offering higher unemployment compensation may also improve the situation of individuals who are working as they fear the risk of job loss less.

Our research complements the main theme in research on labor market institutions and unemployment which concentrates on the distorting effects of regulations and social insurance programs. Regulations and social insurance programs create disincentives (affecting individuals and firm's decision-making), e.g. in people's job searching behavior or in firm's hiring decisions, and thus affect the level of unemployment.

How can the benefits of these regulations and programs be measured? Previous research typically focuses on the consumption smoothing role of unemployment insurance (Gruber, 1997). We focus on subjective well-being, i.e. the degree to which survey respondents are satisfied with their life as a whole. Subjective well-being is a broad measure of individual welfare. It not only captures the effects of consumption smoothing but also reflects people's prospects about their future such as their perceived economic security (Luechinger *et al.*, 2010). We analyze these aspects for both unemployed and employed members of the work force.

This paper relates to two broad strands of literature. The first strand studies subjective well-being. The existing literature confirms that unemployment is perhaps one of the most important negative shocks to individual well-being (Clark and Oswald, 1994). Winkelmann and Winkelmann (1998) find a negative effect of personal unemployment on life satisfaction that would require a sevenfold increase in income to compensate. Moreover, people care about high rates of unemployment even when they themselves are not unemployed. People report experiencing a diminished sense of subjective well-being when the unemployment rate is higher, even after controlling for personal unemployment (Di Tella *et al.*, 2003). Luechinger *et al.* (2010) show that this effect is partly due to higher economic insecurity. They compare the effect of regional unemployment on the life satisfaction of people employed in the private sector to the effect on

public servants. While the former group is negatively affected, the latter group with particularly secure jobs is not.

The second strand discusses the role of institutions and policies in affecting employment. It is useful to group these studies into studies focusing on cross country evidence (mainly OECD) and into microeconomic studies for usually one specific country. In terms of macro studies, Nickell and Layard (1999) use data until the mid 1990 and study the role of labor market institutions in affecting equilibrium unemployment. Results indicate that the benefit system and wage setting (taxes, union bargaining) matter. In contrast, employment protection legislation does not have a strong impact on unemployment. Blanchard and Wolfers (2000) challenge their findings arguing that shocks in combination with employment discouraging institutions explain the rise in unemployment. Nickell *et al.* (2005) argue that shocks alone can not explain the rise in European unemployment but that changes in labor market institutions are essential. Bassanini and Duval (2006) find that labor market institutions and interactions between institutions matter for unemployment and employment to population ratios. Belot *et al.* (2007) and Bassanini *et al.* (2009) report that employment protection legislation decreases productivity. In terms of theory, Blanchard and Tirole (2008) study the joint design of unemployment insurance and employment protection in the form of a layoff tax. Their central result is that policy design requires unemployment benefits to be identical to layoff taxes (see also Boeri *et al.* (2003) who study the joint design of unemployment insurance and employment protection legislation in a politico-economic framework).

With respect to micro studies, a range of studies focuses on the role of unemployment insurance in shaping job finding.¹ These studies all find that more generous unemployment insurance prolongs unemployment duration. This finding corroborates the finding from macro studies. A second group of studies focus on the role of employment protection legislation. Acemoglu and Angrist (2001) find that the employment protection instituted by the Americans with Disabilities Act may have lowered employment of disabled. Ichino and Riphahn (2005) report that employment protection increases sickness absences. Kugler and Pica (2008) report that increased dismissal cost reduce turnover in Italian firms. However, Bauer *et al.* (2004) do not find this result for dismissal protection rules in Germany.

In sum, previous evidence on the (un)employment consequences of labor market institutions highlights that extended protection comes with an economic cost. We aim at improving the knowledge regarding the benefits. This should allow a more comprehensive assessment of labor market institutions and the important trade-offs involved in the protection of people from economic shocks.

Our analysis uses data from the Eurobarometer survey covering the time period 1975 to 2007. This is a repeated cross-section survey providing information on subjective well-being, and people's socio-demographic background. We study information for 13 European countries. We combine this micro information on subjective well-being with aggregate indicators on protection

¹Recent studies on the role of potential benefit duration include Card and Levine (2000), Hunt (1995), Katz and Meyer (1990), Lalive and Zweimüller (2004), Moffitt (1985), Moffitt and Nicholson (1982), Winter-Ebmer (1998), Lalive *et al.* (2006) and Van Ours and Vodopivec (2006). Recent contributions on the role of the benefit level include Carling *et al.* (2001) and Roed and Zhang (2003).

via unemployment insurance and with two indices of the stringency of employment protection legislation from the OECD. Finally, we merge the individual survey data with two measures for economic shocks, i.e. the change in the rate of unemployment and the output gap.

Section 2 outlines the theoretical framework that is underlying our empirical analysis. In Section 3, we explain the empirical strategy. The data is introduced in Section 4. Section 5 presents first results of our empirical analysis. Section 6 offers concluding remarks.

2 Theoretical Framework

Life involves turbulence. A steady process of innovations and changes in circumstances challenges individuals and provides them with incentives to adapt their behavior. Some changes occur to them as shocks that open up new economic opportunities. However, in other instances, they pose a risk to their economic living conditions. This is the case if, e.g., changes devalue human capital or increase the risk of job loss. Individuals experience economic insecurity, which reduces their well-being. There is a wide variety of shocks that change the fundamentals in a society be it technological innovations, changes in political risks, ups and downs in the world economy or policy changes of the government and the central bank. Even changes in expectations of future fundamentals might lead to a reallocation of resources.

People try to protect themselves against the downside risk of economic shocks. This protection is partly privately organized. In many economically developed countries, collective arrangements play an important role though. In particular, there are state unemployment insurance systems and employment protection legislation. These labor market institutions affect the well-being of workers in potentially many direct and indirect ways. Over and above the insurance effect, there are incentive effects on labor supply and demand that affect productivity, labor market liquidity and via the effect on investments in human capital also innovation and growth. Thereby, many trade-offs are involved between redistribution and allocation. We highlight some aspects that are central to our analysis. Some predictions for the empirical analysis are derived from a simple theoretical framework.

2.1 Basic Trade-offs in the Insurance of Labor Market Risks

Unemployment insurance provides income for people who have lost their job. The efficiency with which unemployment insurance can work is, however, limited by moral hazard. Individuals who are more generously insured are more likely to enter unemployment and tend to remain unemployed for a longer time. The disincentive effect thus reduces employment and transfers are burdened on fewer shoulders.

Employment protection can also be seen as an insurance. Workers who have a job are partially protected against job loss and the associated shortfall in income. Employment protection consists of advance notice regulations, regulations concerning severity pay, etc. Conceptually, it is useful to distinguish between two components of employment protection regulation: the tax

and the transfer component. The tax component arises due to the costs (legal, etc.) associated with implementing the protection offered to workers. The tax component directly reduces the efficiency in the allocation of labor. Employment protection legislations usually differ depending on the type of contract workers have, i.e., whether it is a temporary contract or a permanent one. In the empirical analysis, we will identify who is likely to have a permanent and or temporary contract. Whether workers benefit from employment protection is theoretically not clear. While it reduces workers' risk of job loss, it also reduces the liquidity of the labor market. First, employers are reluctant to hire new workers if they cannot easily lay them off when demand is weak. Second, employees delay in changing a job even when they are dissatisfied if they lose part of the protection as new entrants in an other firm. Whether the net benefit to workers is positive or negative depends on the importance of the two effects. Employment protection is also expected to affect people who do not have a job. Since employers are more reluctant to hire people with more stringent employment protection (and even more so from the pool of unemployed people), unemployment spells are longer on average. Accordingly, we expect that unemployed people are negatively affected from extended employment protection.²

2.2 A Simple Framework

In a simple framework, we sketch how shocks and the two labor market institutions interact and are reflected in people's subjective well-being. We exploit that our proxy measure for individual welfare reflects people's prospects (see subsection 3.1). People are forward looking and build expectations about future pecuniary and non-pecuniary costs and benefits from alternative life courses. In order to keep our framework as simple as possible, we restrict the non-pecuniary aspects to a psychic costs of individual unemployment. Via expectations, this cost also affects employed people with what might be termed a fear effect. Moreover, we model the forward-looking component in people's subjective well-being as discounted life-time income. Thereby, the non-pecuniary aspects are included as monetary equivalents.

The point of departure is a model economy where individuals can be either employed or unemployed with transitions between these states occurring in a random fashion. Let δ denote the probability that an employed individual loses his or her job. Arguably, δ depends on employment protection legislation E with increased employment protection reducing the risk of losing the job. The risk of job loss δ also depends on economic shocks σ where the risk increases in the extent of the shock. Finally, the generosity of unemployment insurance – proxied by the benefit replacement rate b – may also affect the likelihood that individuals enter unemployment. This means that $\delta = \delta(E, b, \sigma)$ with $\delta_E < 0$, $\delta_b > 0$ and $\delta_\sigma > 0$. Let θ denote the probability that an unemployed individual finds a job. Again, θ depends on shocks, unemployment insurance, and employment protection. Shocks reduce the probability of finding a job, and so do unemployment insurance and employment protection legislation, i.e., $\theta = \theta(E, b, \sigma)$ with $\theta_E < 0$, $\theta_b < 0$, and $\theta_\sigma < 0$.

²From a household perspective, the net effect is open again. Employed members of the household might be the insurance for unemployed people and the intra-household transfers are more secure with stricter employment protection.

We proceed by characterizing an individual's life-time income and how it depends on shocks and institutions. Workers earn a per period salary of w . Discounted life-time income V_e of an individual who is currently employed is

$$V_e = w + \frac{1}{1+r}(\delta V_u + (1-\delta)V_e)$$

where r is the rate of time preference, and V_u is discounted life-time income of a worker who is currently unemployed. This equation can be rearranged to state

$$rV_e = w + \delta(V_u - V_e) \tag{1}$$

Equation (1) says that the per period contribution to life-time income of an individual who is currently employed consists of the wage rate w and the probability to lose one's job times the associated loss in life-time income.

Unemployed individuals receive a payment that is a fraction b of their salary w where b is the benefit replacement rate. Moreover, the unemployment experience entails a psychic cost whose monetary equivalent we denote by χ . This means that the per period contribution to life-time income of unemployed workers can be characterized by

$$rV_u = -\chi + bw + \theta(V_e - V_u) \tag{2}$$

Based on equations (1) and (2), we can characterize the life-time income differential between workers who are currently unemployed and workers who are currently employed, i.e.,

$$V_u - V_e = \frac{-\chi + (b-1)w}{r + \delta + \theta} \tag{3}$$

Four implications follow from equation (3). First, life-time income is lower for individuals who are currently unemployed compared to employed individuals because (i) unemployment benefits are lower than the salary, and (ii) unemployed people experience a psychic cost from their lot. Second, an economic shock will increase the difference in life-time income between unemployed and employed if its effect on the probability of finding employment dominates the effect on entering unemployment, i.e. if $\partial(\delta + \theta)/\partial\sigma < 0$. This condition is likely to be satisfied as the unemployment inflow rate is less cyclical than the unemployment outflow rate (Shimer, 2007). Third, it is not clear how the generosity of unemployment insurance affects the life-time income gap between unemployed and employed workers, direct and indirect. The direct effect of increasing the generosity of unemployment insurance is to reduce the life-time income gap. The indirect effect of unemployment insurance occurs because unemployment insurance affects labor market flows. The indirect effect will neutralize the direct effect if the effect of generosity on the outflow of unemployment dominates the effect of generosity on the inflow into unemployment. Note, however, that if the economic shock is held constant, increasing the benefit replacement rate will tend to unambiguously decrease the life-time income gap between unemployed and

employed individuals. Fourth, employment protection legislation tends to increase the life-time income differential both because employment becomes less transitory (δ decreases) and unemployment more prolonged (θ decreases).

The life-time income of a person who is currently employed is

$$V_e = \frac{w}{r} + \frac{\delta - \chi + (b - 1)w}{r + \delta + \theta} \quad (4)$$

Equation (4) shows that life-time income of employed individuals is driven by shocks and institutions in much the same way as the life-time income differential between workers who are currently unemployed and workers who are currently employed because employed workers risk losing their job which tends to reduce their life-time income by the income differential between unemployed and employed workers. The key insight is, however, that the effects of shocks and institutions on unemployed workers will be stronger than the effects on workers who are currently employed since both shocks and institutions increase the difference in life-time income. Note, however, that employment protection directly affects life-time income of the employed (by reducing the risk of losing one's job). This direct effect mitigates the indirect effect of employment protection that tends to increase life-time income differences between employed and unemployed workers. Moreover, if increasing the generosity of unemployment insurance increases the unemployment inflow, life-time income of employed workers may not increase at all when the unemployment replacement rate increases.

To the extent that employment prospects affect people's subjective well-being, the comparative statics of satisfaction with life with respect to shocks and institutions are represented in the framework. Thereby, the importance that people attach to the future when they judge their well-being is captured by the rate of time preference. For people who judge their life based on current events, the effects of shocks and institutions on life-time income are muted. Remember that our simple framework also models the single most important non-pecuniary cost of unemployment by introducing the monetary equivalent of the psychic cost of unemployment.

3 Empirical Strategy

3.1 Measuring Workers' Well-Being

In order to study the consequences of economic shocks and labor market institutions for individual welfare, we analyze data on the reported subjective well-being of people in their working age.³ This approach hinges on specific assumptions and conditions with regard to the quality of the subjective well-being data:

(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

³For an introduction to the economic analysis of subjective well-being, see, e.g., Frey and Stutzer (2002), Layard (2005), Di Tella and MacCulloch (2006) and Stutzer and Frey (2010).

the utility function, or a sub-utility function, as Kimball and Willis (2006) in our mind rightly conjecture for measures of current affect. The problem of only analyzing a sub-utility 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; i.e., the rational or intellectual aspects of subjective well-being (Lucas *et al.*, 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 job losses.⁴ 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 Eurobarometer, we use a question of overall life satisfaction. This question is asked in the context of 59 surveys that differed in their focus. 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 (2002); Clark *et al.* (2008)).

3.2 Measuring Economic Shocks

Economic shocks could ideally be measured independently of the institutional setting in a country. This would allow us to study in pure form the extent to which labor market institutions mitigate or augment effects on people's well-being. We are not aware of any empirical analysis that targets such a measurement approach in a cross-country perspective.⁵ Instead, we have to rely on measures of economic shocks that are realizations in a country-specific context. We look for measures that are still comparable across countries and over time and that are as comprehensive as possible. Moreover, they should reflect an aggregate shock, i.e., from an individual's perspective, the shock is given.

We propose the output gap and the change in the rate of unemployment as measures of such aggregate shocks. The output gap reflects the deviation of the economy from the potential

⁴Early evidence documented that people's perceived prospects of their financial future are reflected in reported subjective well-being (Frey and Stutzer, 1999). People who expected that their economic situation will worsen in the future reported substantially lower satisfaction with life.

⁵At the country level, Romer and Romer (2004) develop and apply an approach based on narrative records of the U.S. Federal Reserve to determine monetary shocks.

output. The change in the rate of unemployment focuses on shocks that affect the labor market. Both shocks, a negative output gap and a raise in the unemployment rate, indicate increased individual risk to economic well-being. We explore their relationship with people’s *subjective* well-being.

3.3 Estimation Approach

We pursue two approaches to evaluate the contribution of labor market institutions to peoples subjective well-being. Both are based on standard multiple regression analyses in a panel of repeated cross-sections. They differ in how economic shocks are taken into account.

Implicit inclusion of economic shocks

In the first approach, no shock measure is directly included in the estimation equation. We rather study the net consequences of alternative institutions given the shocks that occurred. We apply a difference-in-difference estimator to our panel data and estimate a multiple regression of the following form:

$$SWB_{ijt} = \beta_0 + \beta_1 LMI_{jt} + \beta_2 X_i + \beta_3 Z_{jt} + \beta_4 D_j + \beta_5 D_t + \epsilon_{ijt} \quad (5)$$

The subjective well-being (*SWB*) of individual *i* in country *j* in year *t* is regressed on an indicator for a specific labor market institution (*LMI*). As control variables, we include individual socio-demographic characteristics *X*, country-level variables *Z* and country specific and time specific effects, i.e. *D_j* and *D_t*.

In our evaluation of employment protection legislation, we differentiate between provisions that hold for regular and temporary work contracts. These sets of legislation are expected to first affect workers with a corresponding contract but second via cross-effects also all other people whether employed or not.

Accordingly, we study net effects following the difference-in-difference approach outlined in equation (5). In addition, we pursue a two-step approach and impute information on the probability of holding a temporary work contract ($= p(\text{temp. contr.})_i$). The converse probability reflects the likelihood of a regular contract. This information is based on a separately compiled data set (see below). We add the estimated regressor to the left-hand variables both in the form of a direct effect and of two interaction effects with the variables capturing the level of employment protection.

$$\begin{aligned} SWB_{ijt} = & \beta_0 + \beta_1 p(\text{temp. contr.})_i + \beta_2 EPLR_{jt} \times (1 - p(\text{temp. contr.})_i) \\ & + \beta_3 EPLT_{jt} \times p(\text{temp. contr.})_i + \beta_4 X_i + \beta_5 Z_{jt} + \beta_6 D_j + \beta_7 D_t + \epsilon_{ijt} \end{aligned} \quad (6)$$

Explicit inclusion of economic shocks

It is theoretically attractive to calculate a net effect of alternative institutional arrangements. However, the statistical identification of such effects is difficult. Labor market institutions are not independent of economic shocks. Shocks affect the bargaining in the political process regarding the collective insurance of economic risks. For example, in an economic downturn, there is often pressure to extend the benefit duration of the unemployment insurance. In this case, a generous unemployment benefit system partly reflects depressed well-being due to economic shocks.

In the second approach, we deal with the endogeneity problem. We look at the short-term impact of an economic shock on people’s well-being. In the short-term, we take labor market institutions as given. This allows us to identify the extent to which labor market institutions mitigate or augment the short-term welfare consequences of economic shocks. The baseline equation is extended to include variables capturing the direct effect of specific economic shocks and the interaction term with labor market institutions. Equation 3 summarizes the second approach.

$$\begin{aligned}
 SWB_{ijt} = & \beta_0 + \beta_1 Economic\ shock_{jt} + \beta_2 LMI_{jt} + \beta_3 Economic\ shock_{jt} \times LMI_{jt} \\
 & + \beta_4 X_i + \beta_5 Z_{jt} + \beta_6 D_j + \beta_7 D_t + \epsilon_{ijt}
 \end{aligned} \tag{7}$$

We estimate equations (5) to (7) for different samples and sets of aggregate control variables. Throughout, we include the same set of individual control variables, i.e., respondents’ age, sex, level of education and marital status. We also include country-specific time trends. Standard errors are clustered at the country \times year level.

4 Data

4.1 Eurobarometer

The main data source of our empirical analysis is the Eurobarometer Survey Series (EB). The EB is a repeated cross-section survey in the member states of the European Union. Our analysis includes thirteen European countries, i.e., Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and the United Kingdom.⁶ For these countries, which are also members of the OECD, there exists comparative data on labor market institutions (see below). For the main analysis, we use data from 59 survey waves between 1975 and 2007. The analysis includes 538,502 respondents in the working age (i.e. between 15 and 64 years of age) with non-missing variables. Our dependent variable is a survey question on an individual’s life satisfaction. On a four-point scale, people answer the question ”On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead?” Figure 1 shows average reported satisfaction with life over time in the thirteen countries

⁶In the empirical analysis, observations for Germany are statistically considered as originating from two separate countries, i.e., separate fixed effects are taken into account for observations between 1975 and 1990 for the old German Laender and for observations from 1992 onwards for the reunified Germany.

in our sample.

[Figure 1 about here]

As regressor variables from the EB, we use information about people's employment status (employed, self-employed, unemployed, out of labor force, in education), age, gender, level of education and marital status.

EB data includes a weighting variable to adjust for under- and over-representation of people with regard to six socio-demographic criteria (age, sex, size of household, regional affiliation, size of community) as well as for multiple samples from the same country. We supplement the sampling weight to also adjust for employment status. The weighted fraction of unemployed people in the work force per year and country now corresponds to the OECD unemployment rate.⁷

4.2 OECD Indicators for Economic Conditions and Labor Market Institutions

Information on economic conditions and labor market institutions is from OECD statistics. This includes the standard macro-economic variables GDP per capita, inflation and the rate of unemployment. The OECD defines the aggregate unemployment rate as unemployed workers as share of the labor force in percent, whereby the rate refers to people between 15 and 64 years of age.

In addition, the OECD provides indicators for the generosity of countries' unemployment benefit systems, the level of employment protection and the output gap.

Generosity of unemployment benefits

The OECD calculates the average unemployment benefit replacement rate (Bassanini and Duval, 2006). It takes into account two income situations, three family situations and three different unemployment durations. Regarding income, 100% and 67% of the earnings of an average production worker are considered. The family situations covered are single, with dependent spouse and with spouse in work. Duration refers to first year, second or third year, or fourth or fifth year in unemployment. Figure 2 shows how the average replacement rate differs across countries and develops over time.

[Figure 2 about here]

Employment Protection Legislation

The OECD indicators of employment protection separately capture legislation and provisions holding for regular work contracts and temporary work contracts (Bassanini *et al.*, 2009). The index for the regulation of regular work contracts (EPLR) refers to individual dismissals and incorporates notification procedures, delays before the notice period can start, the length of the notice period and size of severance payments (both by duration of employment), the circum-

⁷As there are no unemployed people in the country samples for Finland in 1993 and 1994 and for West Germany in 1979, we have to exclude them from the econometric analysis.

stances in which a dismissal is considered unfair, and compensation and extent of reinstatement following unfair dismissal. The index for temporary contracts (EPLT) incorporates restrictions on the number of contract renewals and maximum cumulated duration of fixed-term and temporary work agency contracts, as well as the circumstances under which temporary contracts can be used (see also Venn 2009 for a recent account of the OECD indicators). The indicators range from zero to six, whereby six reflects the most restrictive regulation. We also calculate an average employment protection score as a simple mean from the two indicators. Figure 3 provides an overview on the level of employment protection in the different countries and how it evolved since the mid 70s.

[Figure 3 about here]

Output Gap

Data for the output gap is from OECD estimates of potential output in an economy. Based on a supply-side framework and associated measures of productive capital, the productive potential is determined. The output gap is then defined as the difference between actual and potential output as a percentage of potential output (Befy et al. 2006)

4.3 Data Summary

Table 1 presents the descriptive statistics for the individual level variables from the EB survey series as well as for the country level variables for economic conditions and labor market institutions.

[Table 1 about here]

5 Empirical Analysis

The findings are presented in three parts. In the prologue, we provide evidence that economic shocks have negative effects on people’s reported subjective well-being. These results set the stage for the main analysis. In the second part, we assess the consequences of alternative labor market institutions with economic shocks working in the back. In the third part, we combine economic shocks and labor market institutions in the same empirical model. All preliminary results are based on ordinary least squares; this simplifies the interpretation of interaction effects and provides a first descriptive account of the data. As outlined above, all specifications include control variables for respondents’ individual characteristics (age, sex, level of education, marital status) as well as country and year fixed effects and country specific time trends. Standard errors are clustered at the country \times year level.

5.1 Prologue: Economic Shocks and Life Satisfaction

We study the relationship between life satisfaction and two measures of economic shocks, i.e., the change in the rate of unemployment and the output gap. For both indicators, we find an

expected negative partial correlation between economic shocks and subjective well-being. Table 2 presents the findings for changes in the rate of unemployment. The first four specifications refer to the working age population. In estimation (1) a highly statistically significant negative correlation between economic shocks and life satisfaction is estimated. A one percentage point larger increase in the rate of unemployment reduces average reported satisfaction with life by 0.018 units on a scale from one to four (mean=3.07, s.d.=0.73). This effect partly reflects a simultaneous reduction in the level of per capita income (see estimation (2)). Interestingly, the level of unemployment has no further explanatory power over and above the shock in the rate of unemployment. Note that we control for country specific time trends which capture country specific general trends in unemployment. The results are similar if inflation is included as a control variable. A slightly larger negative partial correlation between the change in unemployment and life satisfaction is measured if the sample is restricted to people in the work force.

[Table 2 about here]

Table 3 provides similar results using output gap rather than changes in unemployment as a proxy for the economic shock. Results indicate that there is a positive correlation between the output gap and life satisfaction. This correlation is robust to including log GDP per capita , the unemployment rate, and the inflation rate. Taken together, results from Table 2 and Table 3 indicate that life satisfaction is lower in a time when the economy is moving into a recession, and life satisfaction improves as the economy moves into a boom.

[Table 3 about here]

Of course, these correlations could be entirely driven by individuals losing their job and job loss being associated with reduced life satisfaction. Tables 4 and 5 study whether the negative correlation between our two measures for economic shocks and subjective well-being are due to composition effects in the working age population. Table 4 shows the results for changes in the rate of unemployment. As revealed in a comparison between estimations (1) and (2), only a small fraction of the partial correlation of the macro shock variable is driven by changes in people's employment status. Estimation (3), in addition, studies whether economic shocks affect employed people significantly different than people in an alternative employment status. We observe that unemployed people suffer significantly more from economic shocks, i.e., the negative partial correlation is about twice as large for unemployed as compared to employed people.

[Table 4 about here]

Table 5 provides the corresponding analysis using the output gap rather than changes in the unemployment rate as a measure for economic shocks. Results in estimation (2) indicate that life satisfaction is significantly positively associated with the output gap over and above the composition effect in the working age population. Interestingly, as estimation (3) indicates, both employed and unemployed workers are more satisfied with their lives as the output gap increases with unemployed workers enjoying economic upturns twice as much as employed workers. In contrast, individuals who are out of the labor force are significantly less affected by the current economic development than the employed.

[Table 5 about here]

5.2 Labor Market Institutions and Life Satisfaction

In our main analysis on the role of labor market institutions in people's subjective well-being, we first treat economic shocks as a variable in the background. We study the net consequences of variation in institutions given the shocks that occurred during our observation period. Table 6 shows the results for the generosity of unemployment insurance. The finding reported in column (1) suggests that the levels of life satisfaction across countries and over time are not systematically correlated with the level of unemployment benefits. If current economic conditions as measured by inflation and log GDP per capita are taken into account, the generosity of unemployment insurance is positively related to overall life satisfaction. One interpretation of this pattern of results is that there is a direct positive effect of being more protected by a more generous insurance. However, there is also an indirect negative effect via the lower level of GDP (potentially due to moral hazard). The pattern remains robust when including the unemployment rate. Furthermore, a similar and slightly stronger pattern of results can be observed once the sample is restricted to the work force.

[Table 6 about here]

Table 7 discusses the role of employment protection legislation for life satisfaction. The sample covers individuals who are in the work force. Estimations (1) and (2) show the findings for general employment protection legislation, proxied by the average index referring to regulations covering permanent contracts and temporary contracts. Results indicate a positive association between life satisfaction and employment protection legislation (column 1). The positive association gets weaker once macroeconomic conditions are controlled for (column 2). Estimations (3) and (4) include the two separate sub-components of the general employment protection index. Results indicate that the positive correlation between life satisfaction and employment protection legislation stems from regulations covering temporary contracts rather than permanent contracts (column 3). The relationship between employment protection legislation and life satisfaction disappears, however, once the state of the economy is controlled for (column 4). Estimations (5) and (6) take the probability of having a temporary or permanent contract into account. The empirical specification assumes that workers are not affected by regulations covering regular contracts, if they have a job with a temporary contract, and vice versa. The results indicate that workers who are certain to hold a regular contract are less satisfied with their lives as regulations on regular contracts are tightened. In contrast, regulations covering the ease with which temporary contracts can be renewed are positively associated with life satisfaction for people who are more likely to hold a temporary contract. These results are robust to controlling for the macroeconomic environment.

[Table 7 about here]

5.3 Economic Shocks, Labor Market Institutions and Life Satisfaction

The analyses in the previous two subsections are now combined and we study the joint role of shocks and institutions in workers' well-being. Table 8 reports the findings for changes in the rate of unemployment. The specifications now focus on employed and unemployed people. Taking country specific time trends into account, no correlation between the generosity of the unemployment benefit system and average life satisfaction is observed. However, a more generous benefit system moderates economic shocks. According to specification (4), for employed people, a change in the rate of unemployment by one percentage point reduces life satisfaction by 0.018 units at the mean level of the variable for average replacement rate. This negative partial correlation is much smaller if there is a more generous benefit system in place and much larger if there is a less generous system (as indicated by the positive coefficient of the interaction term shock and benefits). Figure 4 presents this relationship graphically. We further find, that unemployed people report substantially smaller life satisfaction scores than employed people and that they are more strongly negatively affected from a negative employment shock than employed people. In fact, the effect is twice as large ($-0.018 + -0.019 = -0.037$ for the unemployed versus -0.018 for the employed). On average, unemployed people suffer less when there is a more generous unemployment benefit system. Figure 5 shows the average difference between employed and unemployed people for different average replacement rates (based on the coefficients of est. (5)).

[Table 8 about here]

Table 9 discusses the sensitivity of these findings to using the output gap as a measure of the economic shock. The results are robust with the exception of the one for the interaction between shocks and the generosity of the unemployment benefit system for employed people.

6 Concluding Remarks

To be completed

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Figure 1: Average reported life satisfaction in 13 European countries between 1975 and 2009

Note: Sample is restricted to the working age population.

Source: Eurobarometer Survey Series.

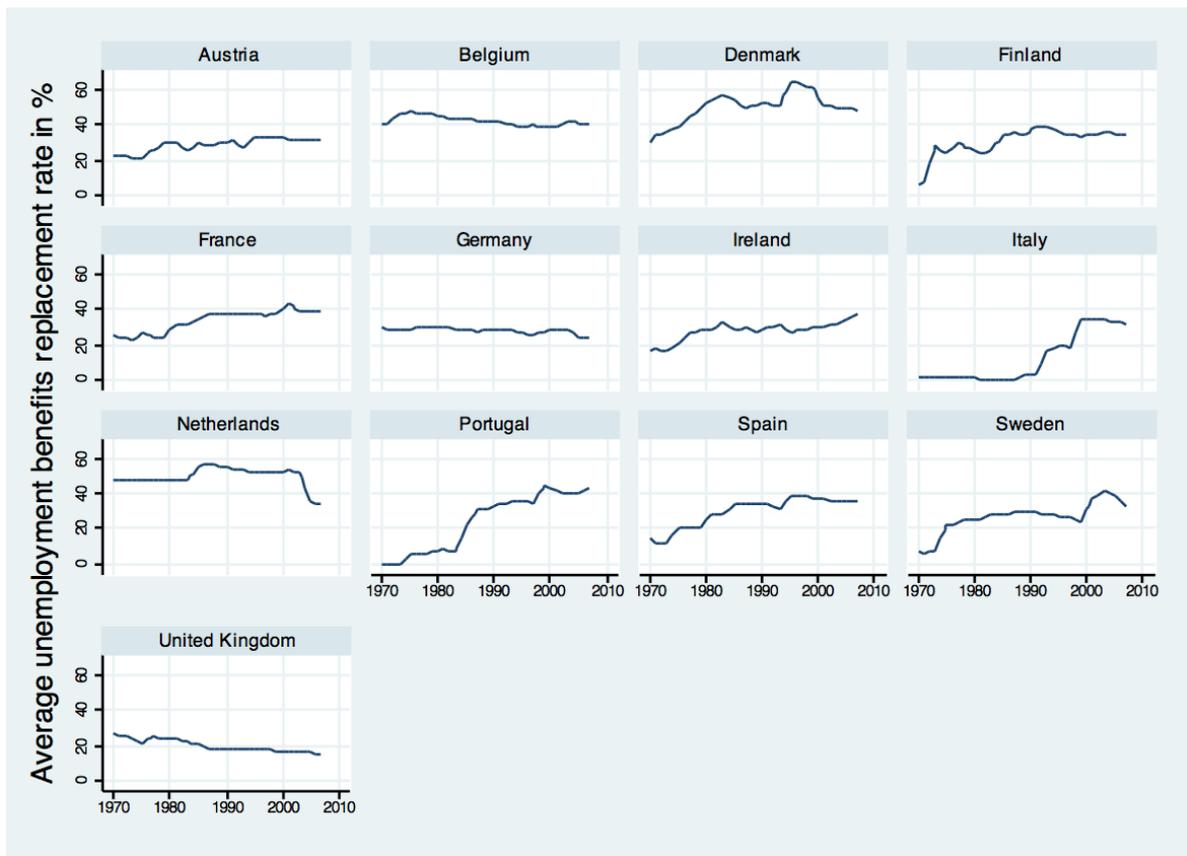


Figure 2: Average unemployment benefit replacement rate in 13 European countries between 1970 and 2007

Source: OECD Employment Database.

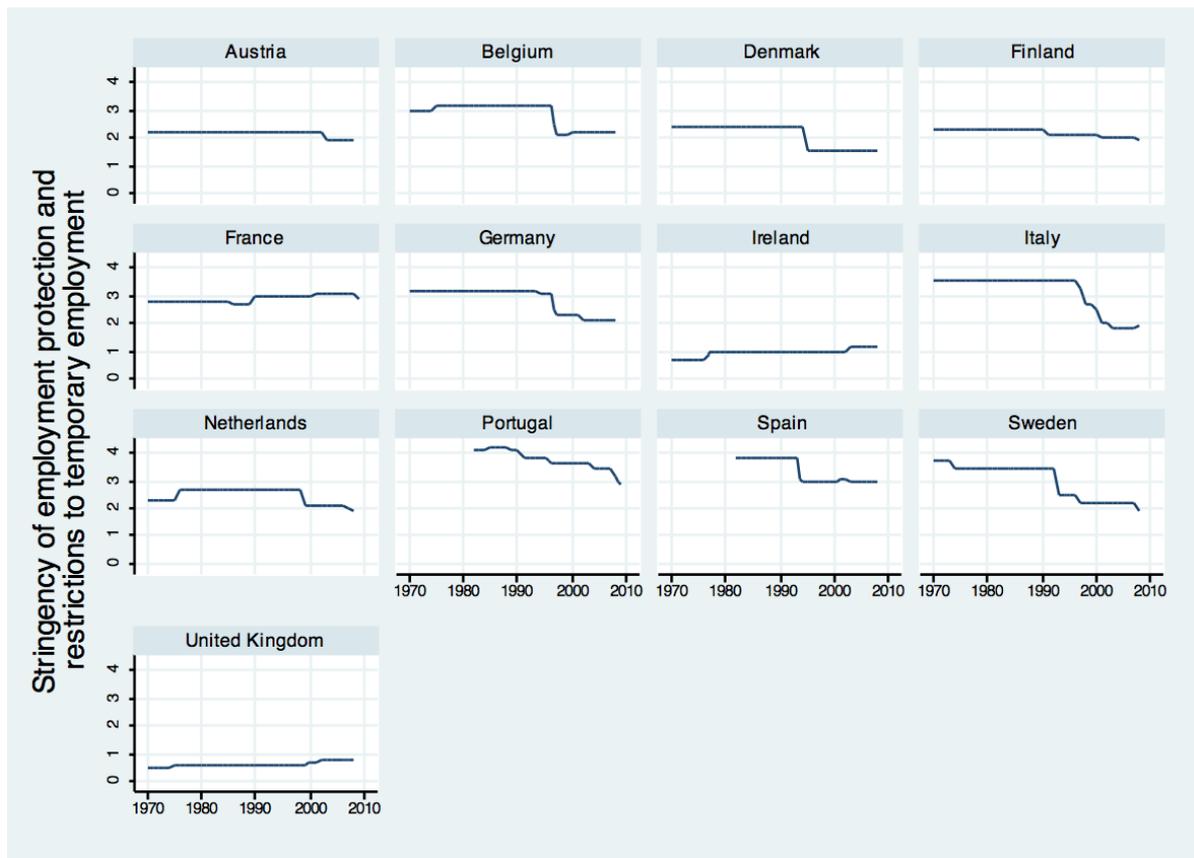


Figure 3: Strictness of employment protection in 13 European countries between 1970 and 2008

Note: Average score for the regulation of regular and temporary work contracts. Higher index values indicate stricter protection.

Source: OECD Employment Database.

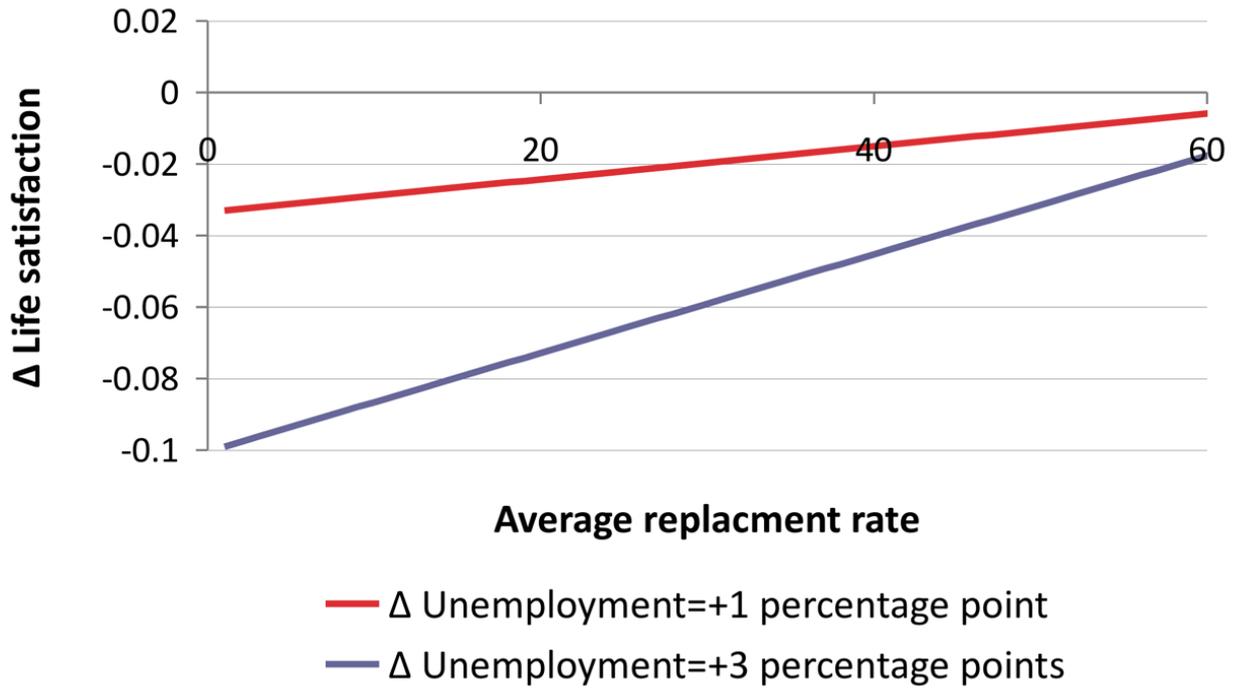


Figure 4: The effect of an unemployment shock on subjective well-being for different levels of unemployment benefits

Note: Simulated effects based on the estimation (4) in Table 9.

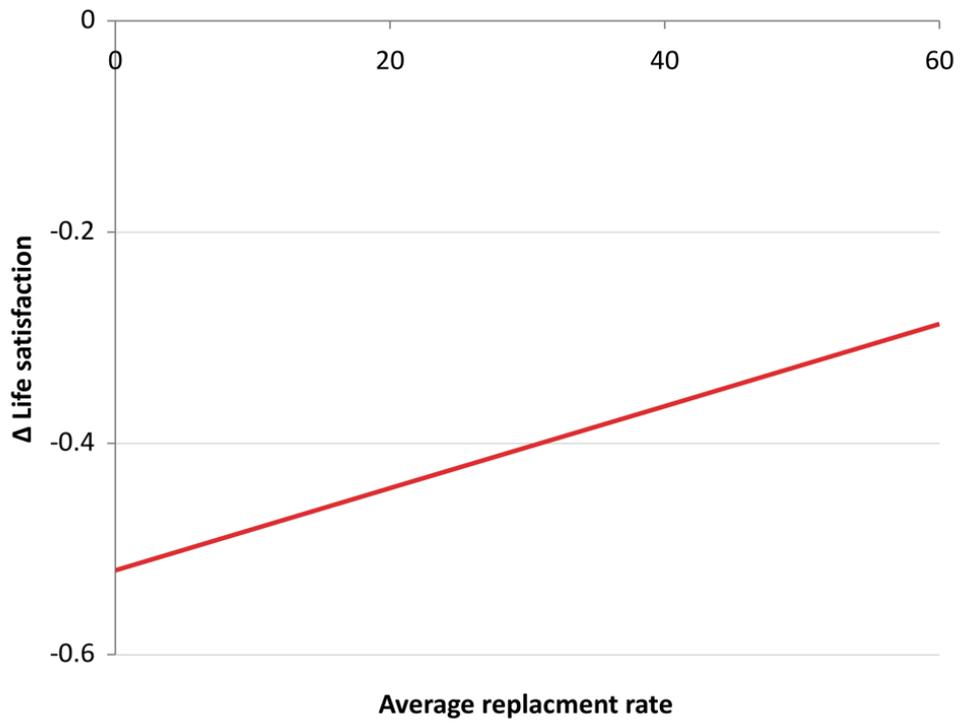


Figure 5: The effect of individual unemployment on subjective well-being for different levels of unemployment benefits

Note: Simulated effect based on estimation (4) in Table 9.

Table 1: Descriptive statistics

	Mean	Std. dev.	Min.	Max.
<i>Individual level</i>				
Life satisfaction	3.08	0.73	1	4
Age	38.29	13.91	15	64
Female	0.52		0	1
Education up to 15 years	0.29		0	1
Education 16-19 years	0.39		0	1
Education 20 years and more	0.22		0	1
Education, still studying	0.11		0	1
Married or living as married	0.62		0	1
Divorced or separated	0.06		0	1
Single	0.27		0	1
Widowed, other marital status	0.05		0	1
Selfemployed	0.08		0	1
Dependent employed	0.50		0	1
Housewife/ Student/ Military Service	0.27		0	1
Retired	0.07		0	1
Unemployed	0.07		0	1
Out of labour force	0.35		0	1
<i>Country level</i>				
ln(GDP per capita)	3.02	0.28	2.12	3.60
Inflation	5.56	5.38	-0.70	33.06
Unemployment rate	7.80	4.00	1.59	23.88
Unemployment benefits	32.35	12.44	0.35	64.94
Employment protection regular contract	2.40	0.87	0.95	5
Employment protection temporary contract	2.51	1.45	0.25	5.38
Change in the rate of unemployment	0.11	1.15	-3.40	5.09
Output gap	-0.31	2.21	-8.93	6.63

Note: Sample is restricted to the working age population.

Table 2: Unemployment shock and the subjective well-being of the working age population in 13 European countries, 1975-2009

	(1)	(2)	(3)	(4)	(5)
Unemployment shock	-0.018*** (-4.71)	-0.015*** (-4.54)	-0.016*** (-4.92)	-0.014*** (-4.19)	-0.016*** (-4.60)
GDP per capita, ln		0.721*** (7.58)	0.753*** (6.20)	0.793*** (6.57)	0.825*** (6.59)
Unemployment rate			0.001 (0.43)	-0.001 (-0.42)	-0.003 (-1.07)
Inflation				-0.008*** (-3.71)	-0.010*** (-4.51)
Individual charact.	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes
Country specific TT	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
No. of obs.	538,502	538,502	538,502	538,502	350,930
No. of clusters	321	321	321	321	321
R^2	0.14	0.15	0.15	0.15	0.15
F	254.41	323.73	333.94	317.85	310.05

Notes: OLS estimations. Unemployment shock measures the change in the rate of unemployment in percentage points. T-values in parentheses. Standard errors are clustered at the country x year level. Sample selection: est. (1) to (4) refer to the working age population, est. (5) refers to the work force.

Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $p < .01$.

Table 3: Output gap and the subjective well-being of the working age population in 13 European countries, 1975-2009

	(1)	(2)	(3)	(4)	(5)
Output gap	0.015*** (6.98)	0.008*** (2.85)	0.008*** (2.80)	0.007*** (2.62)	0.008*** (2.98)
GDP per capita, ln		0.448*** (3.13)	0.416** (2.32)	0.514*** (2.90)	0.468** (2.57)
Unemployment rate			-0.002 (-0.44)	-0.004 (-1.24)	-0.007* (-1.86)
Inflation				-0.009*** (-4.04)	-0.011*** (-4.89)
Individual charact.	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Country specific TT	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
No. of obs.	531,652	531,652	531,652	531,652	346,838
No. of clusters	317	317	317	317	317
R^2	0.15	0.15	0.15	0.15	0.15
F	283.15	290.45	288.66	294.21	280.71

Notes: OLS estimations. T-values in parentheses. Standard errors are clustered at the country x year level. Sample selection: est. (1) to (4) refer to the working age population, est. (5) refers to the work force.

Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $p < .01$.

Table 4: Unemployment shock, subjective well-being and the composition of the working age population in 13 European countries

	(1)	(2)	(3)
Unemployment shock	-0.018*** (-4.71)	-0.016*** (-4.42)	-0.017*** (-4.16)
Self-employed		0.003 (0.56)	0.003 (0.55)
Other employment		0.061*** (7.69)	0.060*** (7.59)
Unemployed		-0.394*** (-35.58)	-0.394*** (-36.00)
Out of labor force		-0.083*** (-10.40)	-0.084*** (-10.33)
Shock x self-employed			-0.001 (-0.15)
Shock x other employment			0.005 (0.84)
Shock x unemployed			-0.024** (-2.28)
Shock x out of labor force			0.002 (0.40)
Individual charact.	Yes	Yes	Yes
County FE	Yes	Yes	Yes
Country specific TT	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
No. of obs.	538,502	538,502	538,502
No. of clusters	321	321	321
R^2	0.14	0.16	0.16
F	254.41	296.01	290.93

Notes: OLS estimations. Unemployment shock measures the change in the rate of unemployment in percentage points. T-values in parentheses. Standard errors are clustered at the country x year level. Reference group: employed people.

Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $p < .01$.

Table 5: Output gap, subjective well-being and the composition of the working age population in 13 European countries

	(1)	(2)	(3)
Output gap	0.015*** (6.98)	0.013*** (6.41)	0.013*** (6.05)
Self-employed		0.000 (0.10)	0.000 (0.08)
Other employment		0.061*** (7.68)	0.060*** (7.54)
Unemployed		-0.392*** (-35.44)	-0.389*** (-35.76)
Out of labor force		-0.084*** (-10.50)	-0.084*** (-10.44)
Output gap x self-employed			0.001 (0.35)
Output gap x other employment			0.006 (1.64)
Output gap x unemployed			0.013** (2.58)
Output gap x out of labor force			-0.007** (-2.00)
Individual charact.	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Country specific TT	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
No. of obs.	531,652	531,652	531,652
No. of clusters	317	317	317
R^2	0.15	0.16	0.16
F	283.15	299.99	289.68

Notes: OLS estimations. T-values in parentheses. Standard errors are clustered at the country x year level. All samples refer to the working age population. Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $p < .01$.

Table 6: Benefits from unemployment insurance and subjective well-being in 13 European countries, 1975-2007

	(1)	(2)	(3)	(4)	(5)	(6)
Benefits from UI	0.000 (0.20)	0.002** (2.38)	0.002* (1.96)	0.001 (0.68)	0.003*** (2.81)	0.002** (2.22)
Inflation		-0.009*** (-4.38)	-0.010*** (-4.51)		-0.011*** (-5.26)	-0.012*** (-5.56)
GDP per capita, ln		0.894*** (9.31)	0.798*** (6.11)		0.987*** (9.87)	0.837*** (6.18)
Unemployment rate			-0.004 (-1.20)			-0.006* (-1.85)
Individual charact.	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Country specific TT	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	538,502	538,502	538,502	350,930	350,930	350,930
No. of clusters	321	321	321	321	321	321
R^2	0.14	0.15	0.15	0.15	0.15	0.15
F	219.18	298.30	292.08	219.91	299.45	289.09

Notes: OLS estimations. T-values in parentheses. Standard errors are clustered at the country x year level. Sample selection: est. (1) to (3) refer to the working age population, est. (4) to (6) refer to the work force.

Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $p < .01$.

Table 7: Employment protection legislation (EPL), benefits from unemployment insurance and subjective well-being in 13 European countries, 1975-2007

	(1)	(2)	(3)	(4)	(5)	(6)
EPL general	0.101*** (4.19)	0.045** (2.03)				
EPL regular contracts (EPLR)			-0.018 (-0.41)	0.035 (0.75)		
EPL temporary contracts (EPLT)			0.062*** (4.92)	0.020 (1.47)		
P(reg. contr.) x EPLR					-0.079* (-1.85)	-0.069** (-2.03)
P(temp. contr.) x EPLT					0.104*** (4.12)	0.071*** (3.10)
P(temp. contr.)					-0.409** (-2.43)	-0.183 (-1.14)
Inflation		-0.011*** (-5.30)		-0.012*** (-5.27)		-0.012*** (-3.90)
GDP per capita, ln		0.706*** (5.24)		0.728*** (4.47)		0.601*** (3.73)
Unemployment rate		-0.008** (-2.41)		-0.008** (-2.19)		-0.012*** (-3.45)
Individual charact.	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Country specific TT	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	350,930	350,930	350,930	350,930	310,751	310,751
No. of clusters	321	321	321	321	282	282
R^2	0.15	0.15	0.15	0.15	0.15	0.15
F	209.99	284.10	208.14	280.84	228.00	273.42

Notes: OLS estimations. T-values in parentheses. Standard errors are clustered at the country x year level. All samples refer to the work force.

Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $p < .01$.

Table 8: Unemployment shock, benefits from unemployment insurance and subjective well-being in 13 European countries, 1975-2009

	(1)	(2)	(3)	(4)
Unemployment shock	-0.021*** (-5.42)	-0.021*** (-5.43)	-0.022*** (-5.47)	-0.018*** (-4.11)
Benefits from UI		0.000 (0.29)	0.001 (0.62)	0.000 (0.19)
Unemployment shock x benefits from UI			0.000 (1.59)	0.4e-3* (1.68)
Unemployed (U)				-0.392*** (-38.01)
U x unemployment shock				-0.019** (-1.99)
U x benefits from UI				0.004*** (5.58)
Individual charact.	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Country specific TT	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of obs.	350,930	350,930	350,930	350,930
No. of clusters	321	321	321	321
R^2	0.15	0.15	0.15	0.17
F	261.64	261.19	251.49	273.05

Notes: OLS estimations. Unemployment shock measures the change in the rate of unemployment in percentage points. T-values in parentheses. Standard errors are clustered at the country x year level. Sample is restricted to the work force. Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $p < .01$.

Table 9: Output gap, benefits from unemployment insurance and subjective well-being in 13 European countries, 1975-2009

	(1)	(2)	(3)	(4)
Output gap	0.016*** (7.09)	0.016*** (7.03)	0.016*** (7.01)	0.013*** (5.65)
Benefits from UI		0.000 (0.37)	0.000 (0.37)	-0.000 (-0.16)
Output gap x benefits from UI			0.000 (0.17)	-0.000 (-0.10)
Unemployed (U)				-0.387*** (-38.01)
U x output gap				0.013*** (2.77)
U x benefits from UI				0.004*** (6.05)
Individual charact.	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Country specific TT	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of obs.	346,838	346,838	346,838	346,838
No. of clusters	317	317	317	317
R^2	0.15	0.15	0.15	0.17
F	260.88	259.02	256.79	275.51

Notes: OLS estimations. T-values in parentheses. Standard errors are clustered at the country x year level. Sample is restricted to the work force.

Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $p < .01$.