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ROSTOCKER ZENTRUM – DISKUSSIONSPAPIER
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No. 15

Who Benefits from Labor Market Institutions? Evidence from Surveys of Life Satisfaction

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Who Benefits from Labor Market Institutions?

Evidence from Surveys of Life Satisfaction

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Abstract

This paper investigates the welfare effects of labor market institutions in Europe, placing an emphasis on how the institutions' effects are differentiated by socio-demographic subgroups. We study how life satisfaction of European citizens is affected by employment protection and the level and duration of unemployment benefit payments. Using data for more than 300,000 individuals in ten European countries, 1975-1998, we find that more employment protection and a higher benefit replacement rate increase life satisfaction of the average citizen. With respect to socio-demographic subgroups, effects are positive for any single group and particularly pronounced for the unemployed and the less educated. Longer duration of unemployment benefit payments does not have significant effects, neither on average nor for most of the subgroups. The institutional variables have their largest impact at the top of the life satisfaction spectrum.

JEL classification: J30, E24, E60, D71, I31

Keywords: unemployment benefit; employment protection; macroeconomic uncertainty; life satisfaction; happiness

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1. Introduction

Employment protection and unemployment benefit are economic institutions designed to protect people against the adverse effects of macroeconomic uncertainties that arise from recession and unemployment. These labor market institutions have a long tradition in many European countries and are widely viewed as essential ingredients of the “welfare state”. However, employment protection and unemployment benefit have recently come under attack for being too generous, placing excessive burdens on employers, employees, and government budgets. Moreover, they are implicated with jeopardizing macroeconomic performance, especially by raising unemployment.¹

Whether or not labor market institutions conform to their stated objectives depends on a number of circumstances. In the first place, protection against macroeconomic uncertainties is valuable only if these uncertainties have a non-negligible effect on citizens’ welfare. Whether this is the case has been subject to controversy for a quarter of a century. As suggested by Fischer (1981) and Lucas (1981), the consequences of (short-term) fluctuations may be small in comparison with long-term growth. Especially, eliminating all macroeconomic fluctuations has been estimated to be worth merely 0.05 percent of consumption (Lucas 2003).

Criticism against this view has been raised on the grounds that it neglects important phenomena that are relevant to an adequate notion of welfare, especially loss aversion and non-pecuniary effects of fluctuation and uncertainty (Layard 2005). Using data from large scale surveys, evidence has been presented that individual welfare -- operationalized by subjective well-being (happiness, life satisfaction) -- is to a considerable extent negatively related to recession, unemployment and inflation². These findings suggest that there are considerable (non-pecuniary) costs to macroeconomic fluctuation and uncertainty.³

Given that evidence, the present paper investigates the welfare effects of labor market institutions, placing an emphasis on how the institutions’ effects are differentiated by socio-demographic subgroups. Using data for more than 300,000 individuals in 10 European countries, 1975-1998, we run weighted ordered probit regressions with self-reported life satisfaction as the dependent variable and labor market institutions among the explanatory variables (controlling for individual socio-demographic characteristics, macroeconomic

¹ Results on this proposition tend to be inconclusive. See Layard et al. 1991, Blanchard and Wolfers 2000, Bertola et al. 2002, Fitoussi et al. 2000, Belot and van Ours 2001, Nickell et al. 2005; for an overview and discussion see Nickell 2003.

² See Di Tella et al. 2001, Graham und Pettinato 2001, Bjørnskov 2003, Wolfers 2003, Welsch 2007.

³ In that literature, unemployment refers to the general unemployment rate. This variable has been found to affect subjective well-being over and above the effect of being unemployed oneself. The unemployment rate is usually taken to reflect the risk of becoming or staying unemployed.

conditions, and country and year fixed effects). We focus on employment protection and the level and duration of employment benefits because it is these particular labor institutions that aim at protection against the consequences of macroeconomic fluctuations (in contrast to, e.g., unionization or minimum wages).

In addition to confirming the common finding that poor macroeconomic performance affects life satisfaction in a sizeable and significant way, we find that more employment protection and a higher benefit replacement rate increase the life satisfaction of the “average citizen”. With respect to socio-demographic subgroups, effects are positive for any single group and particularly pronounced for the unemployed and the less educated. Longer duration of unemployment benefits does not have significant effects, neither on average nor for most of the subgroups. Positive effects of benefit duration are found only for older persons, reflecting their higher risk of long-term unemployment. Interaction effects show that strong labor market institutions mitigate the negative life satisfaction consequences of being personally unemployed and of being less educated. Both the institutional and the macroeconomic variables have their largest impact at the top of the life satisfaction spectrum. Our findings are robust with respect to possible impacts of labor market institutions on macroeconomic performance.

Previous literature has presented evidence of a positive relationship between the level of unemployment benefit and life satisfaction (Di Tella et al. 2003, Graham und Pettinato 2001), focusing predominantly on the 1970s and 1980s. In relation to that literature, the contribution of the present paper is as follows: (1) We consider a more comprehensive set of labor market institutions that comprises not just the unemployment benefit level, but also benefit duration and employment protection. (2) In contrast to the existing literature we investigate how labor market institutions affect various socio-demographic subgroups differentiated by sex, age, education level and occupational status. (3) We use a more recent data set that reflects current labor market institutions more accurately. (4) We control for country size bias and ensure that the considered sample is representative, both of which have been neglected in the literature so far.

The paper is organized as follows. Section 2 presents our empirical approach and data. Section 3 presents and discusses the results. Section 4 concludes.

2. Method and Data

We consider a life satisfaction regression of the following form:

$$LS_{ict} = \alpha_1 EP_{ct} + \alpha_2 BR_{ct} + \alpha_3 BD_{ct} + \alpha_4 UR_{ct} + \alpha_5 IR_{ct} + \alpha_6 GR_{ct} + \sum_k \beta_k D_{kict} + \gamma_c + \delta_t + \varepsilon_{ict} \quad (1)$$

in which the dependent variable, LS_{ict} , is self-rated life satisfaction of individual i in country c and year t . EP_{ct} , BR_{ct} and BD_{ct} are measures of employment protection, the benefit replacement rate, and benefit duration, respectively, by country and year. UR_{ct} , IR_{ct} and GR_{ct} are the unemployment rate, the inflation rate, and the growth rate, respectively, by country and year. D_{kict} refers to the k th socio-demographic characteristic of individual i in country c and year t .⁴ Finally, γ_c and δ_t are country and time fixed effects and ε_{ict} is the error term.

Extended versions of this basic specification include interaction terms of the macroeconomic or institutional variables and the socio-demographic subgroup dummies for sex, age, education level and occupational status.⁵ The binary character of the subgroup dummies allows us to interpret the results as subgroup effects.

Our data base covers the period 1975-1998 and refers to the following countries: Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain and the UK. The data on life satisfaction and socio-demographic characteristics are taken from the *Eurobarometer* survey series. The *Eurobarometer* public opinion surveys are conducted on behalf of the European Commission and are representative surveys per Member State of persons aged 15 and over. The socio-demographic characteristics to be included in the regression are income, age, sex, educational attainment, marital status and occupational status.⁶

The life satisfaction question reads as follows: "On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead." The responses are rated as follows: "very satisfied" = 4, "fairly satisfied" = 3, "not very satisfied" = 2, "not at all satisfied" = 1. Given that not all of the required socio-demographic characteristics are available for all individuals, the regressions refer to 307,640 observations, whereas the complete sample includes 439,301 observations. To check whether the restricted sample is

⁴ Most of the socio-demographic characteristics are captured by category dummies (e.g. male/female).

⁵ We also tried interaction effects with income. However, in no case the estimated effect was significant.

⁶ The variable for occupational status differentiates people that are unemployed from those that are employed or out of the labor force. We do not further subdivide the latter group because tests showed that estimated effects do not significantly differ between the sub-categories employed, retired and housewife/-man. In addition, being retired is to some extent controlled for through the age group.

still representative, Table 1 reports the frequencies of the four life satisfaction categories for both samples. The distribution of the used sample is almost identical to that of the representative sample. Hence, our considered sample is still representative.

The data on labor market institutions are taken from Nickell and Nunziata (2002), to which the reader is referred for details. Employment protection (*EP*) is constructed on the basis of an extensive collection of employment protection dimensions. It takes the value zero in the case of no employment protection and 2 in the case of high employment protection. The benefit replacement rate (*BR*) is defined as a percentage of average before-tax earnings and refers to the first year of unemployment. Benefit duration (*BD*) is measured by the benefit replacement rate in the second to fifth year of unemployment, relative to that in the first year.⁷

The rates of unemployment, inflation, and growth are taken from the OECD online database and the Penn World Tables. They are entered in our data as percentages.

Summary statistics of the covariates are provided in Table A1 in the Appendix. The correlations of the labor market institutions and macroeconomic variables are presented in Table A2 in the Appendix. It can be seen that the labor market institutions tend to be negatively correlated with both the inflation and the growth rate. In addition, benefit duration and employment protection are negatively correlated, suggesting that policy making views them as substitutes.

Given the discrete character of our dependent variable the model is estimated using a weighted ordered probit maximum likelihood estimator with Huber/White robust standard errors and correction for clustering. The latter is necessary since individual and macro data are combined. In addition, we use a weighted estimator, to accommodate the circumstance that country-years differ with respect to the number of individuals surveyed. Hence, we weigh the observations for each country across time and for each year across the countries, using the respective number of individuals as weights. Of course, a weighted estimator would be unnecessary, if the (randomly drawn) individuals did not differ across countries and time. However, comparing weighted and unweighted estimates reveals that this strong assumption does not hold. That is, unweighted estimates are biased towards “big” countries (because individuals are different across countries due to, e.g., cultural differences) and towards years with larger “return runs” (because the characteristics of the representative individuals change over time).

⁷ More specifically, Nickell and Nunziata (2002) use the following formulation for the benefit duration indicator: $BD = 0.6 (BR_{2,3} / BR_1) + 0.4 (BR_{4,5} / BR_1)$, where $BR_{2,3}$ and $BR_{4,5}$ denote the average benefit replacement rate in the second and third and in the fourth and fifth year, respectively.

The probit model treats life satisfaction as specified by equation (1) as an unobserved, or latent, variable. The model involves threshold levels which determine how the continuous latent variable is translated into the discrete life satisfaction categories $j = 1, \dots, 4$. Accordingly, the estimated coefficients from equation (1) represent marginal effects of the explanatory variables with respect to the latent variable. They are to be distinguished from the marginal probability effects MPE_{jl} , which give the marginal effect of the l th exogenous variable (e.g. employment protection) on the probability of belonging to life satisfaction category j .⁸ Since the MPE is applicable only to continuous explanatory variables, we compute them only with respect to the macroeconomic and institutional variables, respectively.

3. Results

3.1 Basic Results and Robustness Checks

Table 2 shows the main estimation results. Regression 1 is a benchmark regression that aims at checking the proposition that macroeconomic uncertainties affect subjective well-being. The results confirm findings from previous literature that life satisfaction is negatively and significantly linked to the unemployment and inflation rate; it is positively and weakly significantly related to the growth rate. Since there is a strong negative association between *individual* unemployment and life satisfaction, the significant coefficient of the unemployment rate indicates that *general* unemployment qualifies as a social bad whose effect concerns not just the unemployed. Especially, a high unemployment rate may create fear of losing one's job and experiencing income losses.

In addition to the occupational status, the other socio-demographic variables also affect life satisfaction in the way familiar from the literature (see Frey and Stutzer 2002): Income, higher education, and marriage are positively associated with life satisfaction. Females report higher life satisfaction than males, whereas age takes the usual u-shaped profile. Household size and being divorced, separated or widowed are negatively associated with life satisfaction. The coefficient estimates for the socio-demographic characteristics are remarkably robust to the treatment of the institutional and macroeconomic variables.

Given that – according to regression 1 – unemployment and other macroeconomic conditions negatively affect life satisfaction, we now turn to the labor market institutions. Regression 2 adds employment protection, the benefit replacement rate and benefit duration to the previous

⁸ See, for example, Greene (2003) on how the MPE is calculated.

regression. We find that life satisfaction is positively and significantly related to employment protection and the benefit replacement rate. With respect to benefit duration, however, there is only an insignificant relationship. This suggests that people are more concerned with the risk of getting laid off at all than with the possibility of staying unemployed for several years.⁹ This seems to apply even though the share of people with long-term unemployment experience has increased over the period considered.¹⁰

With respect to the macroeconomic variables, we find that the coefficient on unemployment increases in magnitude (in comparison with regression 1) and becomes more significant. The coefficient on inflation decreases in magnitude and becomes insignificant, whereas the coefficient on growth increases and gains in significance.

It thus appears that controlling for labor market institutions diminishes the adverse well-being effect of inflation and accentuates that of unemployment and recession. Put alternatively, disregarding the labor market institutions, as in regression 1, implies a bias for the coefficients of the macroeconomic variables. Especially, inflation appears more detrimental in regression 1 because inflation is negatively correlated with strong labor market institutions, and recession (*low* growth) appears less detrimental because recession is positively correlated with labor market institutions (see Table A2).

The regressions discussed so far take macroeconomic conditions as fixed. As mentioned in the introduction, however, there exist propositions in the literature that labor market institutions may undermine macroeconomic performance. Assuming that this is the case, the beneficial effects found above may mask detrimental *indirect* effects on life satisfaction through poor macroeconomic outcomes.

To account for this possibility, we consider a version of regression 2 which omits the macroeconomic variables. This regression should capture both the institutions' direct effects and their indirect effects through their impact on macroeconomics, implicitly reflecting the respective weights that citizens place on macroeconomic and institutional variables.

Results of this robustness check are presented in regression 3. We find that the coefficients for the labor market institutions in regression 3 are not significantly different from their realizations in regression 2. This provides us with some confidence that indirect effects might not be too important.

⁹ Recall that the benefit replacement rate refers to the first year of unemployment whereas the indicator of benefit duration is a weighted average over up to five years.

¹⁰ It will be seen below that benefit duration is more important for people older than 50 or 60 years, because for them the propensity of long-term unemployment is particularly high.

An alternative, more explicit way to throw some light on indirect effects is by combining the estimates from regression 2 concerning the life satisfaction effects of macroeconomic and institutional variables with estimates from the literature concerning the institutions' macroeconomic effects. Such estimates have been provided by Nickell et al. (2005) with respect to the unemployment effects of employment protection and of the benefit replacement rate.¹¹ Using the same employment protection indicator as does the present paper, they estimate that the unemployment rate increases by 0.15 percentage points if employment protection increases by one unit. Multiplying this with the coefficient for the unemployment rate from our regression 2 (-0.02607) gives about -0.004 as the indirect effect of employment protection on life satisfaction. This is negligible in comparison with our estimate of the direct effect of employment protection (0.262).¹² For an increase in the benefit replacement rate by one unit Nickell et al. (2005) estimate an increase in the unemployment rate by 3.8 percentage points.¹³ Multiplying this with the coefficient for the unemployment rate from regression 2 gives about -0.099 as the indirect effect of the benefit replacement rate on life satisfaction. This is negligible in comparison with our estimate of the direct effect (0.910). We thus find that, even if employment protection and more generous unemployment benefits lead to higher unemployment (which is subject to controversy¹⁴), their overall effect on life satisfaction is strongly positive.

The findings from our robustness checks are reassuring. They suggest that indirect effects through macroeconomic performance are not likely to affect our primary conclusions concerning the life satisfaction consequences of labor market institutions. These conclusions are that more employment protection and a higher benefit replacement rate increase life satisfaction whereas the duration of unemployment benefits does not seem to have such an effect.

¹¹ The following discussion disregards benefit duration since we found no significant effect on life satisfaction.

¹² These effect sizes are expressed with respect to the continuous latent life satisfaction variable of the ordered probit model. Applying this metric is appropriate for the purpose of comparing direct and indirect effects. Marginal probability effects with respect to the discrete observed life satisfaction categories will be considered below.

¹³ We take the parameters of the first regression in table 5 in Nickell et al. (2005). With respect to the benefit replacement rate, that regression includes an interaction effect with benefit duration in addition to the direct effect. To accommodate this, we use the mean of benefit duration in the period 1960 to 1995, which is the period analyzed in that paper.

¹⁴ See the literature mentioned in footnote 1.

3.2 Subgroup Effects

The above results must be viewed as referring to the “average citizen”. We now examine how the life satisfaction of various subgroups is affected by labor market institutions. As a reference group we consider persons that are male, below the age of 30, not unemployed, and have education up to the age of 15. Comparison groups differ with respect to occupational status, sex, education level, and age.

We consider two regressions. In regression 4, the labor market institutions are differentiated by subgroup while the macroeconomic variables are not. In regression 5, the macroeconomic variables, but not the labor market institutions, are differentiated. As Table 3 shows, the coefficients for the respective undifferentiated variables are very similar to their counterparts in regression 2.

With respect to the socio-demographic characteristics, the negative effect on life satisfaction of being personally unemployed is different in regressions 4 and 5 than in regressions 1 to 3. In regression 4 the parameter is -0.76, which is statistically different from -0.5 (regressions 1 to 3). The coefficient value -0.5 indicates the overall effect of being unemployed whereas the coefficient value -0.76 indicates the basic effect of being unemployed, net of the interaction effect with the labor market institutions. The difference between the two coefficients indicates that labor market institutions reduce the negative consequences of being unemployed. Similarly, in regression 5, the coefficient on being unemployed takes the value -0.29, which is also statistically different from -0.5. The difference between these two coefficients means that poor macroeconomic performance accentuates the negative consequences of being unemployed whereas good macroeconomic performance mitigates them.

The coefficients for the education variables also change markedly in regressions 4 and 5. The parameters for people with intermediate and higher education as well as for those who are still in education increase in regression 4. All three coefficients are significantly different from their realizations in the regressions 1 to 3. The basic (net of interaction) effects on life satisfaction of better education are thus larger than the overall effects. This implies that the labor market institutions reduce the positive life satisfaction effects of better education and mitigate the negative effects of being less educated. In regression 5 the parameters for the education variables are no longer statistically different from zero. This suggests that the positive life satisfaction effect of better education arises especially under conditions of poor macroeconomic performance, as better educated people are less affected by poor macroeconomic conditions.

Table 4 presents the results from regression 4 for those variables that are differentiated by subgroup, that is, for the labor market institutions. With respect to the reference group (top part of the table) we find the coefficient on employment protection considerably increased in comparison with regression 2, whereas the coefficient on the benefit replacement rate is unchanged. The benefit duration coefficient is changed to a small extent only and remains insignificant.

Turning to the comparison groups, we see that employment protection is of (significantly) higher importance to the unemployed than to the reference group.¹⁵ The results are different when we consider females: Their life satisfaction is less affected by employment protection, but the effect remains significantly positive (see the z statistic in the last column). Similar results apply to education levels and age groups: People with better education and of higher age esteem employment protection less than does the reference group, but the effect is always significantly positive.

The result that the unemployed esteem employment protection higher than those employed is in contrast to common views which maintain that employment protection will be determined more by the interest of employed workers than unemployed ones and, hence, does not contribute to overall welfare (see, e.g., Saint-Paul 2000, 2004). Our result may indicate that unemployed people regret the lack of better employment protection, as they feel it may have prevented them from getting laid off. They do not seem to view employment protection as a factor which adversely influences their chances of getting re-employed.

In contrast to this result, the result concerning better educated persons is less surprising, as these people are less prone to becoming unemployed. Similar reasoning may apply to women and older people, as their labor force participation rate is lower.

With respect to the benefit replacement rate, we find it more important for the unemployed, the women, and for people with better education. However, these coefficients are significantly different from the reference group only in the case of women. The opposite applies to age: A higher benefit replacement rate tends to be less important to people of higher age than to the reference group. However, these differences are hardly significant and the overall effect is significantly positive.

The result that a higher benefit replacement rate is important especially for the unemployed and for women may indicate that the task of “making ends meet” in the case of unemployment mainly concerns the female household members.

¹⁵ Coefficients are to be interpreted as differences to the reference group.

For both, employment protection and the benefit replacement rate, it is remarkable that the life satisfaction of older and potentially retired persons is positively and significantly affected by these institutions (though in some cases to a smaller extent than the life satisfaction of other age groups). A possible explanation for this finding is that members of this generation have children in the working age for whom they display some intergenerational altruism. In addition, some of these people may have made special labor market experiences during and around the first world war¹⁶ which make them particularly sensitive to issues of unemployment-related social security.

Overall, one should note that, despite differences in magnitude, the effects of employment protection and the benefit replacement rate are significantly positive for all socio-demographic groups.

For benefit duration, we find little difference at the subgroup level, that is, the subgroup terms are insignificantly different from the reference group in most cases. Exceptions are provided by people with better education. For them, longer benefit duration affects life satisfaction significantly less than for the reference group. This may reflect their lower propensity of staying unemployed, combined with the burden of high contributions to unemployment insurance. In spite of this negative differential effect for the better educated, the overall effect is insignificant. With respect to age, however, it should be noted that the coefficients as well as the z-statistics become larger with increasing age (up to 69 years). In fact, for the group aged 60-69, the coefficient is positive and weakly significant. This likely reflects the circumstance that the propensity of staying long-term unemployed is particularly pronounced for these people.

Table 5 presents the results from regression 5 for those variables that are differentiated by subgroup, that is, for the macroeconomic variables. With respect to the reference group (top part of the table), we see that both the unemployment rate and inflation are more important than for the average person (see regression 2). Especially, the effect of inflation is now significantly negative. The coefficient of the growth rate is of similar magnitude as for the average, but insignificant.

At the subgroup level, we see that the unemployment rate is significantly less important for people still in education and for people above the age of 60. It tends to be more important for those actually unemployed (though the difference is only weakly significant). Effects are significantly different from zero except for those above the age of 60.

¹⁶ In the first year of our dataset (1975) the youngest person in retirement age (aged 65) was born in 1910.

Inflation tends to be less of a problem for people with better education and for people between 30 and 49 years, that is, the prime working age. The growth rate, while insignificant for the reference group, is important mainly for the better educated and for those between 40 and 69 years.

3.3 Marginal Probability Effects

We now address the question of how the institutional and macroeconomic variables affect the probability of belonging to the different life satisfaction categories, the so-called marginal probability effects (*MPEs*).

For methodological reasons, the *MPE* with respect to the highest life satisfaction category ($j = 4$) has the same sign as the estimated coefficients reported in Table 2, whereas the opposite is the case for the lowest category ($j = 1$). Concerning the two intermediate categories, the sign of the *MPEs* depends on the estimated thresholds. For the regressions 1 to 3, the *MPEs* of the intermediate categories have the same sign as the lowest category (see Table 6). Overall, there is a monotonic relationship, that is, a positive (negative) coefficient of an explanatory variable increases (reduces) the probability of being satisfied and reduces (increases) that of being dissatisfied.

In terms of magnitudes the *MPE* for $j = 1$ is the smallest with respect to all variables in regressions 1 to 3. From this it follows that for those who report to be “not at all satisfied” the considered economic and institutional variables are of comparatively little importance with respect to a switch to a more satisfied category. For example, a rise in employment protection by one unit in regression 2 reduces the probability that an individual is “not at all satisfied” by just 0.016 percentage points. The institutional and macroeconomic variables are most important with respect to reporting to be “very satisfied”. The variables considered thus have their largest impact at the top of the life satisfaction spectrum.

We now consider those socio-demographic configurations for which the *MPEs* are largest. Table 7 displays these *MPEs* with respect to the labor market institutions (using the estimates from Table 4) whereas Table 8 shows these *MPEs* with respect to the macroeconomic variables (using the estimates from Table 5). The *MPEs* of employment protection for less educated unemployed young men are much stronger (for all categories) than for the average person. In contrast to this, the *MPE* of employment protection for highly educated retired women is very small for all categories and turns negative (but not significantly different from zero) for the category “very satisfied” ($j = 4$). For benefit duration we find a similar switch. In this case less educated unemployed women in the age group 60 to 69 would experience a

stronger increase in the probability of belonging to the category “very satisfied” than any other subgroup. Life satisfaction of highly educated young persons that are not unemployed drops, if the duration of benefit payments increases. However, the calculated effects for benefit duration are not significant. For the benefit replacement rate the probability of belonging to the category very satisfied is positive for both extreme value groups. To sum up, it is the less educated unemployed and mostly young citizens who benefit most from labor market institutions.

For the macroeconomic variables the picture is similar. A lower inflation and unemployment rate affects the less educated unemployed and young citizens more positively than other subgroups. However, it is the less educated unemployed at age 30 to 39 that are slightly negatively affected by higher growth rates.

3.4 Unobserved Heterogeneity

Unobserved country-specific and time-specific influences on life satisfaction have been captured in our regressions by country and time dummies. We are now interested in the pattern of these effects across the specifications. Comparing the country and time effects across specifications that do or do not include certain variables allows for an assessment of which variables drive these effects.

Figure 1 shows the time effects for the five regressions considered. The time effects in regression 3 differ markedly from the rest of the estimated effects. This is the only regression without macroeconomic variables. In contrast to that, the pattern of the time dummies does not change much if we omit the labor market institutions (regression 1). Hence, the time effects are mainly driven by the macroeconomic variables, whereas labor market institutions do not capture much of the unobserved heterogeneity across time. This is intuitive, as labor market institutions are relatively stable over time.

With respect to the country effects the results are different. In this case the omission of the labor market institutions (regression 1) changes the pattern across countries markedly, as Figure 2 displays. Differences are particularly pronounced for Denmark, Belgium, France, Germany, and the Netherlands. Whether macroeconomic effects are included or not has little effect on the country dummies. Country specific effects are thus mainly driven by institutional differences.

4. Conclusions

In this paper we undertook a comprehensive assessment of the relationship between life satisfaction and several types of labor market institutions in Europe. Being based on data for more than 300,000 individuals, 1975-1998, we found that stronger employment protection and higher benefit replacement rates increase life satisfaction of the “average citizen”, whereas benefit duration has no significant effects on average. These findings appear to be robust with respect to possible feedback effects of the labor market institutions on macroeconomic variables. Moreover, we found that the institutional and macroeconomic variables have their largest impact at the top end of the life satisfaction spectrum.

At the subgroup level, we found that the positive effects of employment protection and a higher benefit replacement rate apply to all socio-demographic groups, but are particularly strong for the unemployed and the less educated. The insignificance of longer benefit duration applies not just to the average, but to most of the subgroups. An exception is, however, provided by older people, for whom the effect is positive and weakly significant, reflecting their high risk of being long-term unemployed. We also found that strong labor market institutions effectively mitigate the negative life satisfaction consequences of being personally unemployed and of being less educated.

In terms of policy implications our results yield no support for the idea that employment protection or the level of unemployment benefit are excessive. On the contrary, cutting back on these institutions may have significantly negative effects on life satisfaction throughout all groups of society. Conclusions with respect to the duration of unemployment benefits, however, are less straightforward. With respect to benefit duration, our differentiated results suggest that age-specific reforms may be contemplated.

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Table 1: Distribution of self rated life satisfaction (*LS*)

<i>LS</i>	Maximum Sample		Used Sample	
	Frequency	Percent	Frequency	Percent
1	17,920	4.08	12,804	4.16
2	57,696	13.13	41,705	13.56
3	242,011	55.09	169,454	55.08
4	121,674	27.70	83,677	27.20
Total	439,301	100.00	307,640	100.00
Mean of <i>LS</i>	3.05		3.06	

Table 2: Basic regression results. Dependent variable: life satisfaction

	Regression 1		Regression 2		Regression 3	
	Coefficient	z-stats	Coefficient	z-stats	Coefficient	z-stats
unemployment rate	-0.02192	(-2.62)	-0.02607	(-3.97)	▪	
inflation rate	-0.01287	(-2.20)	-0.00864	(-1.59)	▪	
growth rate	0.00841	(1.75)	0.01231	(3.06)	▪	
employment protection	▪		0.26153	(2.72)	0.29558	(2.65)
replacement rate	▪		0.91011	(6.18)	0.80096	(4.95)
benefit duration	▪		0.14049	(0.88)	0.18669	(1.15)
age	-0.02917	(-11.68)	-0.02922	(-11.70)	-0.02923	(-11.47)
age ²	0.00034	(14.58)	0.00034	(14.57)	0.00034	(14.40)
income	0.05595	(18.56)	0.05740	(19.01)	0.05741	(17.82)
size of household	-0.02499	(-4.91)	-0.02587	(-4.96)	-0.02611	(-4.96)
male			reference group			
female	0.07145	(4.26)	0.07166	(4.28)	0.07188	(4.30)
not unemployed			reference group			
unemployed	-0.50270	(-13.29)	-0.49886	(-12.88)	-0.50039	(-12.67)
education ≤ 16 years			reference group			
education 16 -19 years	0.06728	(3.25)	0.06506	(3.11)	0.06436	(3.03)
education ≥ 20 years	0.13336	(4.88)	0.12614	(4.70)	0.12617	(4.38)
still in education	0.20528	(5.23)	0.20381	(5.11)	0.20423	(5.06)
single			reference group			
married	0.14570	(6.93)	0.14604	(7.21)	0.14631	(7.09)
living together	0.00499	(0.19)	0.00615	(0.24)	0.00493	(0.19)
divorced	-0.29288	(-12.71)	-0.28852	(-12.41)	-0.28775	(-12.54)
separated	-0.35441	(-9.73)	-0.35067	(-9.61)	-0.34765	(-9.27)
widowed	-0.15255	(-7.15)	-0.15280	(-7.16)	-0.15250	(-7.13)
fixed country effects	✓		✓		✓	
fixed time effects	✓		✓		✓	
countries	10		10		10	
observations	307640		307640		307640	
Pseudo-R ²	0.0939		0.0950		0.0943	

Table 3: Regression results with subgroup effects. Dependent variable: life satisfaction

	Regression 4		Regression 5	
	Coefficient	z-stats	Coefficient	z-stats
unemployment rate	-0.02548	(-3.86)	see table 5	
inflation rate	-0.00819	(-1.50)		
growth rate	0.01238	(3.13)		
employment protection	see table 4		0.26308	(2.72)
replacement rate			0.88769	(6.22)
benefit duration			0.15171	(0.96)
age	-0.02214	(-6.61)	-0.02715	(-5.98)
age ²	0.00031	(10.31)	0.00027	(6.82)
income	0.05789	(18.57)	0.05809	(18.95)
size of household	-0.02276	(-3.96)	-0.02276	(-4.04)
male		reference group		
female	0.09026	(2.46)	0.07923	(1.58)
not unemployed		reference group		
unemployed	-0.75721	(-5.57)	-0.29041	(-2.47)
education ≤ 16 years		reference group		
education 16 -19 years	0.21598	(4.03)	-0.00327	(-0.07)
education ≥ 20 years	0.38692	(5.55)	0.01198	(0.18)
still in education	0.35859	(5.29)	0.11375	(1.55)
Single		reference group		
married	0.14488	(6.99)	0.14800	(7.44)
living together	0.00797	(0.31)	0.00350	(0.14)
divorced	-0.28463	(-12.51)	-0.27865	(-11.85)
separated	-0.34181	(-9.02)	-0.33760	(-9.58)
widowed	-0.15008	(-7.09)	-0.14738	(-7.28)
fixed country effects	✓		✓	
fixed time effects	✓		✓	
countries	10		10	
observations	307640		307640	
Pseudo-R ²	0.0964		0.0959	

Table 4: Regression results for labor market institutions differentiated by subgroup
(regression 4 continued)

		Coefficient	z-stats different from	
			reference	Zero
employment protection (<i>ep</i>)		0.43769	*	(4.59)
replacement rate (<i>brr</i>)		0.90994	*	(4.47)
benefit duration (<i>bd</i>)		0.12021	*	(0.54)
<i>institution</i>	<i>subgroup dummy</i>			
<i>EP</i>	unemployed	0.12505	(2.07)	(5.07)
	female	-0.06985	(-5.80)	(4.05)
	education 16 -19 years	-0.09181	(-3.30)	(3.64)
	education \geq 20 years	-0.17529	(-5.28)	(2.55)
	still in education	-0.14119	(-3.82)	(3.07)
	age 30 - 39 years	-0.03258	(-1.71)	(4.19)
	age 40 - 49 years	-0.05375	(-1.85)	(3.92)
	age 50 - 59 years	-0.11805	(-3.11)	(3.16)
	age 60 - 69 years	-0.14537	(-2.74)	(2.73)
	age 70 - 99 years	-0.22235	(-3.22)	(1.83)
<i>BR</i>	unemployed	0.19900	(1.35)	(4.27)
	female	0.12641	(2.32)	(5.81)
	education 16 -19 years	0.04211	(0.57)	(5.61)
	education \geq 20 years	0.10051	(1.29)	(6.06)
	still in education	0.19720	(1.53)	(6.48)
	age 30 - 39 years	-0.13406	(-1.99)	(4.54)
	age 40 - 49 years	-0.17343	(-1.80)	(4.43)
	age 50 - 59 years	-0.16655	(-1.45)	(4.68)
	age 60 - 69 years	-0.07020	(-0.41)	(4.81)
	age 70 - 99 years	0.05655	(0.29)	(5.25)
<i>BD</i>	unemployed	0.02983	(0.21)	(0.58)
	female	0.01626	(0.53)	(0.64)
	education 16 -19 years	-0.10751	(-2.32)	(0.06)
	education \geq 20 years	-0.16809	(-2.11)	(-0.24)
	still in education	-0.11325	(-1.13)	(0.03)
	age 30 - 39 years	0.07997	(1.40)	(1.08)
	age 40 - 49 years	0.05803	(0.67)	(1.08)
	age 50 - 59 years	0.08922	(0.82)	(1.33)
	age 60 - 69 years	0.16513	(1.07)	(1.82)
	age 70 - 99 years	0.00996	(0.05)	(0.79)

Table 5: Regression results for macroeconomic variables differentiated by subgroup
(regression 5 continued)

		Coefficient	z-stats different from	
			reference	zero
	unemployment rate (u)	-0.02885	*	(-2.92)
	inflation rate (p)	-0.01602	*	(-2.75)
	growth rate (g)	0.01090	*	(1.21)
<hr/>				
<i>macros</i>	<i>subgroup dummy</i>			
<i>UR</i>	unemployed	-0.01900	(-1.77)	(-2.56)
	female	-0.00136	(-0.38)	(-3.66)
	education 16 -19 years	0.00210	(0.40)	(-4.64)
	education \geq 20 years	0.00821	(1.16)	(-3.45)
	still in education	0.01192	(1.98)	(-2.00)
	age 30 - 39 years	-0.00255	(-1.12)	(-3.16)
	age 40 - 49 years	-0.00374	(-0.87)	(-3.56)
	age 50 - 59 years	0.00185	(0.30)	(-3.27)
	age 60 - 69 years	0.01546	(2.13)	(-1.60)
	age 70 - 99 years	0.01834	(2.10)	(-1.27)
<i>IR</i>	unemployed	0.00003	(0.01)	(-1.74)
	female	0.00020	(0.08)	(-2.35)
	education 16 -19 years	0.00723	(2.35)	(-1.60)
	education \geq 20 years	0.00714	(1.74)	(-1.65)
	still in education	-0.00192	(-0.54)	(-3.29)
	age 30 - 39 years	0.00643	(2.12)	(-1.99)
	age 40 - 49 years	0.00771	(2.08)	(-1.87)
	age 50 - 59 years	0.00669	(1.52)	(-2.02)
	age 60 - 69 years	0.00803	(1.62)	(-1.55)
	age 70 - 99 years	0.00898	(1.46)	(-1.12)
<i>GR</i>	unemployed	-0.01112	(-1.74)	(-0.02)
	female	0.00039	(0.15)	(1.48)
	education 16 -19 years	0.00292	(0.72)	(2.25)
	education \geq 20 years	0.00208	(0.36)	(1.77)
	still in education	-0.00329	(-0.50)	(1.22)
	age 30 - 39 years	-0.00468	(-1.15)	(0.96)
	age 40 - 49 years	0.00569	(0.93)	(2.72)
	age 50 - 59 years	-0.00051	(-0.08)	(1.89)
	age 60 - 69 years	0.00744	(1.02)	(3.55)
	age 70 - 99 years	0.00123	(0.12)	(1.61)

Table 6: Marginal probability effects for regression 1 to 3

	<i>j = 1</i>	<i>j = 2</i>	<i>j = 3</i>	<i>j = 4</i>
regression 1				
unemployment rate	0.0013	0.0037	0.0019	-0.0069
inflation rate	0.0008	0.0022	0.0011	-0.0041
growth rate	-0.0005	-0.0014	-0.0007	0.0027
regression 2				
employment protection	-0.0158	-0.0445	-0.0225	0.0827
replacement rate	-0.0549	-0.1547	-0.0784	0.2879
benefit duration	-0.0085	-0.0239	-0.0121	0.0444
unemployment rate	0.0016	0.0044	0.0022	-0.0082
inflation rate	0.0005	0.0015	0.0007	-0.0027
growth rate	-0.0007	-0.0021	-0.0011	0.0039
regression 3				
employment protection	-0.0179	-0.0502	-0.0255	0.0936
replacement rate	-0.0484	-0.1361	-0.0691	0.2536
benefit duration	-0.0113	-0.0317	-0.0161	0.0591

Table 7: “Extreme” marginal probability effects for regression 4

	<i>j = 1</i>	<i>j = 2</i>	<i>j = 3</i>	<i>j = 4</i>
<i>employment protection</i>				
Less educated unemployed young man	-0.0337	-0.0957	-0.0483	0.1778
high educated retired women	0.0018	0.0051	0.0026	-0.0094
<i>replacement rate</i>				
unemployed young woman	-0.0741	-0.2101	-0.1061	0.3903
not unemployed man, age 40-49	-0.0442	-0.1253	-0.0633	0.2327
<i>benefit duration</i>				
Less educated unemployed woman, age 60-69	-0.0199	-0.0564	-0.0285	0.1047
high educated young not unemployed	0.0029	0.0081	0.0041	-0.0151

Table 8: “Extreme” marginal probability effects for regression 5

	<i>j</i> = 1	<i>j</i> = 2	<i>j</i> = 3	<i>j</i> = 4
<i>unemployment rate</i>				
high educated retired man	0.0002	0.0004	0.0001	-0.0007
less educated unemployed women, age 40-49	0.0037	0.0095	0.0026	-0.0158
<i>inflation rate</i>				
high educated retired woman	-0.0000	-0.0001	-0.0000	0.0001
young man in education	0.0013	0.0032	0.0009	-0.0054
<i>growth rate</i>				
less educated unemployed, age 30-39	0.0003	0.0009	0.0002	-0.0015
high educated, age 60-69	-0.0015	-0.0038	-0.0010	0.0063

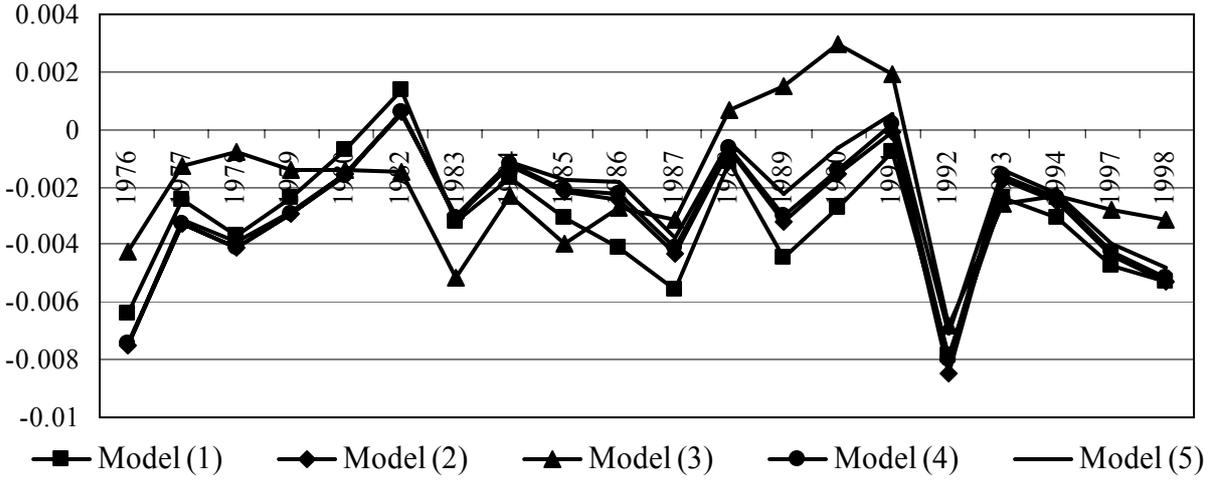


Figure 1: Unobserved heterogeneity across time

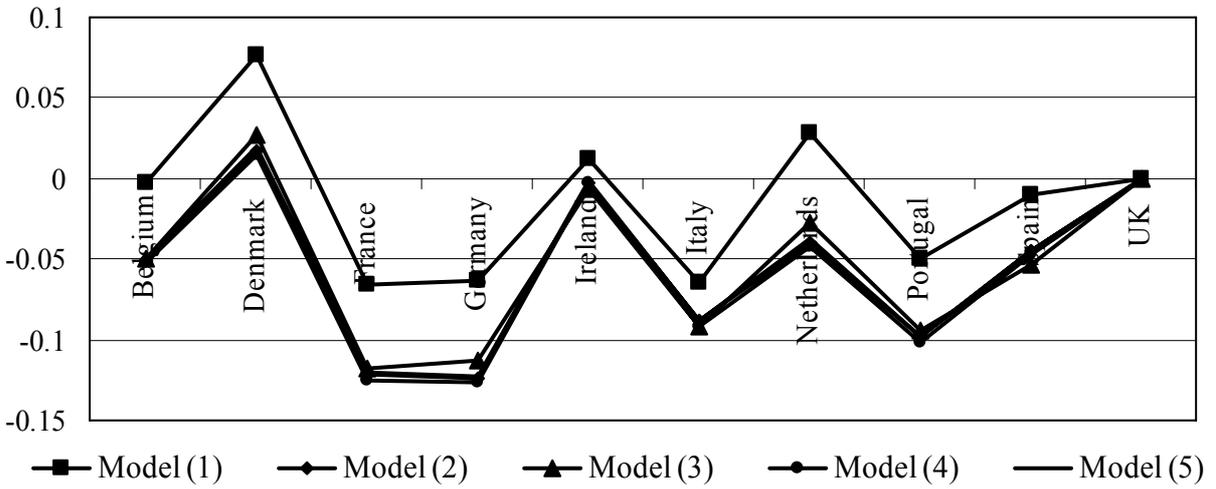


Figure 2: Unobserved heterogeneity across countries

Appendix

Table A1: Descriptive statistics of the covariates

	Mean	Std. Dev.	Min	Max
employment protection	1.29	0.53	0.33	2.00
replacement rate	0.48	0.20	0.01	0.88
benefit duration	0.51	0.24	0.00	1.02
unemployment rate	8.08	3.21	3.00	19.80
inflation rate	6.33	4.70	-0.70	24.20
growth rate	2.61	2.17	-2.62	11.06
Age	43.49	17.61	15	99
age ²	2201.31	1668.24	225	9801
Income	6.56	3.21	1	12
Female	0.51	0.50	0	1
education 16 -19 years	0.34	0.48	0	1
education \geq 20 years	0.17	0.38	0	1
still in education	0.07	0.25	0	1
Married	0.62	0.49	0	1
Divorced	0.03	0.17	0	1
living together	0.04	0.20	0	1
Separated	0.01	0.11	0	1
Widowed	0.08	0.28	0	1
Unemployed	0.06	0.24	0	1
size of household	3.07	1.54	1	9

Table A2: Correlations of macroeconomic and institutional variables

	unemployment rate	inflation rate	growth rate	employment protection	replacement rate	benefit duration
unemployment rate	1					
inflation rate	-0.1911	1				
growth rate	0.1237	-0.1775	1			
employment protection	-0.1009	-0.0017	-0.1033	1		
replacement rate	0.0343	-0.2122	-0.0145	0.1478	1	
benefit duration	-0.1670	-0.4425	-0.0183	-0.5153	0.2049	1