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Working Paper

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GLO Discussion Paper, No. 372

Provided in Cooperation with:

Global Labor Organization (GLO)

Suggested Citation: Morgan, Robson; O'Connor, Kelsey J. (2019) : Labor market policy and subjective well-being during the Great Recession, GLO Discussion Paper, No. 372, Global Labor Organization (GLO), Essen

This Version is available at:

<https://hdl.handle.net/10419/200980>

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Labor market policy and subjective well-being during the Great Recession

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Average subjective well-being decreased in Europe during the Great Recession, primarily among people with less than a college education and people younger than retirement age. However, some countries fared better than others depending on their labor market policies. More generous unemployment support, which provided income replacement or programs to assist unemployed workers find jobs, mitigated the negative effects for most of the population, although not youth. In contrast, stricter employment protection legislation exacerbated the negative effects. We present further evidence that suggests the exacerbating effects of employment protection legislation are due to greater rigidities in the labor market, which in turn affect perceived future job prospects. Our analysis is based on two-stage least squares regressions using individual subjective well-being data obtained from Eurobarometer surveys and variation in labor market policy across 23 European countries.

JEL: I31, I38, J28, J65, H53

Keywords: life satisfaction, active labor market policy, unemployment support, employment protection legislation, Eurobarometer

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Acknowledgements: The authors would like to thank Stefano Bartolini, Andrew Clark, Richard A. Easterlin, Francesco Sarracino, Claudia Senik, and the participants at numerous seminars and conferences for helpful comments. Morgan acknowledges financial support from Minerva and the University of Southern California. O'Connor acknowledge financial support of the Observatoire de la Compétitivité, Ministère de l'Economie, DG Compétitivité, Luxembourg, and STATEC. Views and opinions expressed in this article are those of the authors and do not reflect those of Minerva, the University of Southern California, STATEC, or funding partners.

1. Introduction

Economic recessions have large negative effects on subjective well-being, which are largely explained by decreased income and increased unemployment (De Neve et al., 2018; Di Tella et al., 2003; Helliwell and Huang, 2014; O'Connor, 2017; Wolfers, 2003). Unemployment is particularly bad, negatively affecting more than just the unemployed (Arampatzi et al., 2015; Di Tella et al., 2003; Helliwell and Huang, 2014). This paper addresses the questions – did generous labor market policy reduce the negative impact of the Great Recession on subjective well-being in Europe? If so, which types of labor market policies were most effective? And which population group was most affected by these policies? Data from 23 European countries during the Great Recession are analyzed to address these questions.

Prior research has established that labor market policy has a significant and positive relationship with the level of subjective well-being, in particular the generosity of unemployment support programs (Boarini et al., 2013; Di Tella et al., 2003; Ochsén and Welsch, 2012; Wulfgramm, 2014) and level of employment protection legislation (Boarini et al., 2013; Ochsén and Welsch, 2012). While informative, these studies address a different question from our own. They focus on the different *levels* of well-being associated with different policies. Instead this study estimates the within country *changes* in well-being due to the Great Recession and evaluates the moderating role of different labor market policies.

To our knowledge, only two studies assess the moderating role of labor market policies on labor market conditions associated with economic recessions. Wulfgramm (2014) finds that policies providing support for unemployed persons reduce the negative effects of becoming unemployed on subjective well-being. This finding is identified using both policy variation between countries at a point in time and variation in policy changes within countries over time. The second study provides evidence that unemployment support positively affects the subjective well-being of people who remain employed during economic recessions (Carr and Chung, 2014). Each study makes a valuable contribution, but many questions remain unanswered. Most importantly, neither evaluates the role of employment protection legislation, nor do they estimate the relationships at a societal-wide level. Wulfgramm focuses on unemployed people while Carr and Chung focus on the employed. Spillover effects on individuals out of the labor force are also potentially important. Kim and Do (2013) find that when a spouse becomes unemployed there is

a significant decrease in the subjective well-being of their partner. However, the moderating role of labor market policies has not been evaluated for groups outside of the labor force.

This study evaluates the role of employment protection legislation and policies that provide unemployment support. We estimate the relations for people of all occupational statuses, thus capturing the societal-wide effects. What is more, heterogeneous relations for different groups of people are estimated. Although not previously considered, it is important to know if the groups that suffered most during the Great Recession are the ones benefiting from, or are being hurt, by labor market policy.

The findings show that subjective well-being dropped significantly during the Great Recession in 23 European countries for the following groups: people with less than a high school education, people with a high school education, youth, and working aged people. Those with a college education were not significantly affected. For the groups that suffered a significant decrease in subjective well-being, labor market policies significantly affected the magnitude (with the exception of youth). However, the effects were not strictly positive. Labor market policies that provided more generous unemployment support significantly mitigated the negative effect of the Great Recession, while stricter employment protection legislation significantly exacerbated the effect. Further evidence suggests that the exacerbating relationship can be explained by stricter employment protection affecting people's feelings about their job prospects.

2. Why Subjective Well-Being

The term “subjective well-being” is used in this paper to refer to either self-reported measures of life satisfaction or evaluative happiness. Subjective well-being measures are based on questions from surveys where respondents are asked to evaluate their life as a whole, and then report feelings about their life on a numerical scale.¹ It is a comprehensive measure of well-being that individuals assess based on their own preferences and life circumstances. Growing evidence supports subjective well-being as a valid and reliable measure of well-being (for comprehensive list of supporting studies see Helliwell et al., 2012). In 2008, a commission comprised of 25 social scientists, including six Nobel Laureates in economics, recommended that governments

¹ Life satisfaction and evaluative happiness are considered comparable because they correlate with the same explanatory variables (Helliwell et al., 2012). Evaluative measures capture more than an individual's present emotional state, which is captured using momentary questions that often comprise affect measures. “How happy were you yesterday?” represents a typical momentary question.

start officially collecting subjective well-being data (Stiglitz et al., 2009). At present, almost all Organization for Economic Co-operation and Development (OECD) countries are officially collecting subjective well-being data and “many national leaders are talking about the importance of well-being as a guide for their nations” (Helliwell et al., 2015).

The motivation to use subjective well-being as the measure of well-being in this paper is based on the sensitivity of subjective well-being measures to both economic and non-economic changes that occur during recessions. Previous studies have found that accounting for non-economic costs is important to explain reported declines in well-being during recessions. This is clearly illustrated by comparing the disparate findings between studies that infer the well-being costs of economic fluctuations based on traditional economic outcomes and studies that measure well-being using responses to subjective well-being questions. For example, Lucas (1987) finds that the risk associated with economic fluctuations is equivalent to only 0.1% of consumption. He concludes that these effects on well-being are only “of second order importance.” In response to the study by Lucas and other similar studies (e.g. Romer, 1996), Wolfers (2003) uses subjective well-being data and finds, the costs of economic fluctuations on well-being are much more substantive. Another study finds, while subjective well-being follows macroeconomic movements, the well-being impacts of recessions extend beyond the loss of income and rising unemployment (Di Tella et al., 2003). The authors conclude that “standard economics tends to ignore what appear to be important psychic costs of recessions. (Di Tella et al., 2003, p. 823)” A study by Deaton (2011) specifically measures psychic costs during the Great Recession in the United States, finding that a fall in subjective well-being was accompanied by increases in worry and stress. Helliwell and Huang (2014) also report findings using data from the United States, finding that changes in unemployment, such as those caused by recessions, indirectly affect people who are not unemployed. They conclude that, “[their findings] suggest that more precise estimation and understanding of the indirect effects of unemployment are essential for any cost-benefit analysis of policies designed to mitigate the economic and social effects of unemployment.”

3. Expectations of the moderating roles of labor market policies

We focus on two transmission mechanisms through which labor market policies could moderate the impact of the Great Recession on subjective well-being: unemployment and stress from labor

market conditions. Concerning unemployment, we know that: (1) it increased during the Great Recession; (2) during recessions it negatively affects the subjective well-being of both unemployed people and those who are not unemployed (Arampatzi et al., 2015; Di Tella et al., 2003); and (3) unemployment support mitigates the negative effects on both the unemployed (Wulfgramm, 2014) and employed (Carr and Chung, 2014). Beyond unemployment, the Great Recession reduced incomes and wealth, increased underemployment, and generally, increased stress especially associated with labor market conditions. To represent the effects experienced by people who were not unemployed, we use the term “stress from labor market conditions”.

Two diagrams are presented below to illustrate our expectations. The first diagram illustrates the moderating effects of unemployment support programs on subjective well-being, in the face of unemployment and stress from labor market conditions due to a recession. The second illustrates the same for employment protection legislation.

3.1 Unemployment support programs

Figure 1 presents the expected relationship between unemployment support programs and change in subjective well-being during a recession. The arrows in the model represent the magnitude and direction of changes that occur during the recession (column 1) and their effects on subjective well-being (column 2). The dark arrows represent the changes with no policy, *ceteris paribus*, and the lighter arrows represent how policy is expected to affect each change.

(insert Figure 1 here)

Row 1 illustrates, we do not expect unemployment support programs to affect the change in unemployment during a recession, but based on the findings of (Wulfgramm, 2014), we expect unemployment support to mitigate the negative effect of unemployment on subjective well-being (column 2). Row 2 illustrates the effects of unemployment support on stress from labor market conditions. We expect stress to decrease because the negative effects of unemployment are mitigated and unemployment represents a major source of concern during recessions. Consequently, individuals experience smaller declines in subjective well-being (consistent with Carr and Chung, 2014).

We expect unemployment support programs to mitigate the negative effects of the Great Recession operating through both reduced unemployment and stress and thereby have an overall positive impact on subjective well-being.

3.2 Employment protection legislation

Figure 2 presents the expected effects of employment protection legislation on the changes in subjective well-being during a recession. In contrast to unemployment support programs, we expect stricter employment protection to have offsetting impacts on well-being through rigidities imposed on the labor market.

(insert Figure 2 here)

Row 1 presents our expectation that employment protection reduces unemployment through restrictions placed on firms to reduce the dismissal of workers (column 1),² especially those on permanent contracts. If increases in unemployment during a recession are reduced, then the recession's negative effects on subjective well-being are reduced (column 2).

However, employment protection reduces firms' ability to adjust their workforce, which implicitly increases the cost of hiring and reduces the number of people firms hire. Row 2 presents the expected effect of an increased cost of hiring workers on the stress from labor market conditions and its effect on well-being. The stress from labor market conditions rises with stricter employment protection legislation because jobs are scarcer. This relationship is supported by the finding that stricter employment protection is related negatively to feelings of job security (Clark and Postel-Vinay, 2009).

The overall impact of employment protection legislation on subjective well-being during a recession depends on whether the positive effects through reduced unemployment dominate the negative effects through reduced hiring and greater stress.

² Employment protection could also increase unemployment in the long run because firms are less willing to hire workers, however this effect is not considered in the present study because the study period is less than two years.

4. Data

To assess the role of labor market policies during the Great Recession, we use individual subjective well-being data and macro data collected from 23 countries in Europe³. Two periods are used, corresponding with the pre-recession peak and the recession trough. In particular, the micro data are from the latter half of 2007 and middle of 2009 based on the available measures closest to the peak and trough business cycle dates from the Center for Economic Policy Research: Business Cycle Dating Committee. Individuals aged 15 to 64 are included. We exclude those who are 65 and above because 65 is a common retirement age in Europe. The macro data is similarly obtained for periods as close to the peak and trough periods as possible, using quarterly-macro data when available and yearly otherwise.

Subjective well-being is measured as the response to the question: “On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead? Would you say you are?” (coded 4-1, with 4 being very satisfied and 1 being not at all satisfied). We refer to this variable as life satisfaction. These data are obtained from the Eurobarometer (European Commission, 2009, 2007) and are nationally representative with weighting. Weighting is also used to give equal weight to each country in the analysis.

The macro data consists of both economic and labor market policy variables. The economic variables include log GDP per capita, unemployment rate, and inflation rate. They are obtained from the OECD (2014a). Four labor market policy variables are used, which can be divided into two broad categories. The first includes policies that provide support for people who become unemployed, which can be further subdivided into two types of unemployment support – programs that assist unemployed workers to find employment (active labor market policy) and income replacement for people who become unemployed (net income replacement). The second broad category includes policies that restrict the ability of firms to freely adjust their workforce (employment protection legislation), which in turn differs for fixed term and non-fixed term contract workers.

Labor policy variables are constructed by the OECD to make them as comparable as possible across countries. They are defined as follows:

³ The largest samples of countries with requisite data are used. See Appendix Table A 1 for the full country listing and policy indicator details.

- Net replacement rate (NRR) measures the average proportion of net in-work income that is maintained for 60 months when someone becomes unemployed (OECD 2014b). NRR is measured on a scale of 0-100.
- Active labor market policy (ALMP) is the percent of GDP spent on active labor market policy (OECD 2014c). Active labor market policy is defined as programs that help unemployed people find new jobs. This includes job placement services, benefit administration, job training, and job creation programs. Because unemployment and GDP changed during the Great Recession for all countries, the active labor market policy variable is converted to expenditure per unemployed person in 2005 measured in thousands of 2005 US dollars.
- Employment protection legislation (EPL) is a synthetic measure from 0 to 6 that reflects the strictness of regulations governing the dismissal of workers in non-fixed contract jobs. It covers regulation of individual and collective dismissals (OECD 2014d). Greater values correspond to stricter regulation.
- The employment protection summary indicator for temporary work (EPL-T) covers fixed term contract jobs (OECD 2014d). It is a measure of how freely firms can use fixed term contracts, that is, it reflects how many times firms can renew fixed term contracts, the types of jobs firms can use fixed term contracts to hire workers, and also regulations on the duration of fixed term contracts. EPL-T is also measured on a 0 to 6 scale, with greater values corresponding to stricter regulations.

Samples vary by analysis based on data availability. The largest possible samples were used, but labor policy variables are not uniformly available. Analysis using NRR is conducted on the full sample of 23 countries. For ALMP, 19 countries are used. For EPL and EPL-T a different set of 19 countries are used. See Appendix Table A1 for a list of countries and policy indicator values when available.

5. Methods

Before assessing the role of labor market policy, we first determine whether the Great Recession affected different population groups differently. We expect there to be heterogeneous impacts consistent with the results of previous studies (Bell and Blanchflower, 2011; O'Connor, 2017). We focus on groups defined by education and birth cohort because their compositions should not

depend much on the Great Recession.⁴ In particular, three groups are defined by educational attainment, including: less than a high school education, a high school education, and a four-year college degree or more. The high school group includes trade school because a small percentage of people fall into this category. We exclude students from the sample for this analysis because their final level of educational attainment is unknown. Birth cohort is also divided into three groups defined by age during the peak period, including: youth, 15 to 24 years of age; middle ages, 25 to 44; and older age, 45 to 64. The analysis by cohort includes students.

To identify the moderating role of labor policies on the changes in life satisfaction during the Great Recession, we use the following specification:

$$LS_{igt} = \alpha + \sum_{g=1}^3 \delta_g group_g X trough_t + \sum_{g=1}^3 \gamma_g group_g X trough_t X policy_j + \beta_0 Y_{jt} + \beta_1 X_{ijt} + c_j + group_g + \varepsilon_{igt} \quad (1)$$

Where LS_{igt} is life satisfaction for individual i , in group g , in country j , at one of two times t (peak or trough); $group_g$ are group dummy variables; $trough_t$ is a dummy variable that takes the value of 1 in the trough period; $policy_j$ represents one of the labor policy variables; Y_{jt} is a vector of macroeconomic variables; X_{ijt} is a vector of micro controls, including: employment status, marital status, gender, age (when estimating effects by level of education), and level of education (when estimating effects by cohort); and c_j are country fixed effects. δ_g represents the conditional mean change in life satisfaction for each group; we expect it to be negative but different for each group. The moderating effect of policy is given for each group by the coefficients γ_g on the interaction term $group_g X trough_t X policy_j$. A positive (negative) γ_g indicates a mitigating (exacerbating) role of a policy on the change in life satisfaction.

Equation (1) accounts for many potential sources of bias primarily by including country fixed effects. All fixed country characteristics and any that are slow to change, such as quality of governance, are captured, which includes the initial policy levels (or main effects). Over the short period from recession peak to trough, the policies were not changed substantively on

⁴ The biggest change in composition was relatively small. From peak to trough, the student population share decreased on average by an amount of less than three percentage points. The next biggest change was for college graduates, who increased as a share by approximately 1.3 percentage points.

average. The correlations for each policy indicator between measurement dates are quite high, the lowest being 0.94, as shown in Appendix Table A1.

We also allow $group_g \times trough_t \times policy_j$ to be endogenous using instrumental variable methods. In particular, $policy_j$ takes the trough policy value and is predicted using the policy variables from the peak period. More precisely, the policy interaction terms $group_g \times trough_t \times policy_{j=trough}$ are predicted in the first stage using $group_g \times trough_t \times policy_{j=peak}$. Of the two instrumental variable conditions, relevance is clearly met. Validity is not testable, but we provide reassurance using an overidentification test in robustness Section 6.4. Moreover, validity is plausible. Policy conditions prior to the Great Recession are not likely to have been determined by the recession itself because it was unexpected by policymakers. It is possible that an omitted variable operates through peak policy rather than trough policy; however, we also believe this concern to be minimal, because current policy is more important for an individual than past policies. Current policies play an important and direct role in individuals' lives when they are needed. While past policies might inform individuals' beliefs about the macro conditions present in society (e.g., through the media), the direct impacts are far more important. In a seminal study Hadley Cantril found that individuals in diverse countries around the world are more concerned with factors present in their daily lives than more abstract concerns (Cantril, 1965). We also control for time-varying micro and macro conditions, especially those communicated by the media (i.e., GDP and the unemployment rate), which should capture what individuals are most concerned about.

We perform the estimation using two stage least squares (2SLS). While the second stage ordinary least squares (OLS) regression treats life satisfaction as cardinal, previous results have shown that the difference between treating subjective well-being as cardinal or ordinal makes little difference (Ferrer-i-Carbonell and Frijters, 2004). Moreover, OLS is preferred for interpretation of the results.

We assess statistical significance is using Wild Cluster Bootstrap methods. Clustering standard errors at the country level is necessary because policy variation occurs at the country level, which means error terms within a country are not independent. Bootstrap methods are necessary because the number of countries is small. Previous work has demonstrated that a small number of clusters leads to rejecting the null hypothesis relatively more frequently, in some cases at more than double the critical value (Bertrand et al., 2004). To address this problem Wild Cluster

Bootstrap methods are used (using 399 replications). The limitation is that only p-values from the bootstrap distribution can be obtained.⁵ For this reason, the bootstrapped p-values are reported in the tables. For a further explanation of Wild Cluster Bootstrap methods see (Cameron and Miller, 2015); when using instrumental variables, see (Davidson and Mackinnon, 2010); and for implementation using STATA, see (Roodman et al., 2018).

6. Results

Before assessing the role of labor market policy, we first estimate the heterogeneous impacts of the Great Recession on life satisfaction. Figure 3 plots the level of life satisfaction during the peak and the trough disaggregated by education and birth cohort. Among the education groups, the group that suffered the largest drop in life satisfaction was those with less than a college degree. All birth cohorts suffered a significant drop in life satisfaction, with the largest being experienced by the youth (less than 25 years old at peak). The magnitudes were generally large too. For those groups experiencing a statistically significant drop, the size is at least as large as the average difference in life satisfaction between people with and without a high school degree (during the peak period).

(insert Figure 3 here)

6.1 Policy effects by level of education and cohort

The results presented in Table 1 presents the moderating policy effects for groups defined by level of education. The positive and significant NRR coefficients presented in columns 1 indicate that unemployment support programs significantly mitigated the negative effect of the Great Recession for the groups that suffered the most, people with less than a high school degree and people with a high school degree but no college degree. The magnitudes are meaningful as well. To interpret the magnitudes, the mean change in life satisfaction by group and standardized beta coefficients are presented. For the two lower educated groups, a ten percentage point increase in NRR would reduce the impact of the Great Recession by 0.08 life satisfaction points, which

⁵ Standard errors cannot be estimated using this method because it includes asymptotic refinement (sample estimates approach the population values at a faster rate), which can only be performed on statistics that do not depend on unknown parameters.

would mitigate approximately two thirds of the impact for the less than high school group and all of the effect for the high school group. The ALMP relations (column 2) also indicate unemployment support programs mitigated the impacts but only significantly for those with a high school degree. It appears that a base level of education is necessary to benefit from the ALMP programs (e.g., placement and training). Both NRR and ALMP did not significantly affect those with at least a college education. It was not clear beforehand which direction the relation would take for this group. Associated with more generous policies, the college-educated group could have experienced positive (like the other population groups) or negative effects, because they likely pay the highest taxes. But in fact, the net effect on college-educated people was insignificant.

(insert Table 1 here)

Stricter employment protection legislation significantly exacerbated the negative effects of the Great Recession, as shown by the negative and significant relations presented in columns 3 and 4. Both EPL and EPL-T had negative effects for each group, except EPL for the college educated. With unemployment controls omitted, the coefficients reflect the net effect of both mechanisms discussed in relation in to Figure 2 (reduced unemployment and greater stress). Meaning, the net negative effect indicates that the harm caused by additional stress from labor market conditions, associated with stricter employment protection (Figure 2, row 2), more than offsets the benefits stricter employment protection has on unemployment in the short run (Figure 2, row 1). The magnitudes on EPL are meaningful as well; contrasting the beta coefficients, they are similar to those for NRR though somewhat smaller. On EPL-T, the magnitudes are smaller than for EPL but larger than for ALMP.

Table 2 presents policy effects on groups defined by cohort. Presented in the first row, no policies significantly affected the youth cohort. As one of the groups most affected, this is an important finding, however understandable. NRR and ALMP likely had no effect on the youth group because in all sample countries, to qualify for unemployment benefits a person must contribute to the state for a minimum number of months. The insignificant relationship of EPL on youth can be explained by the fact that EPL applies to longer-term jobs, for which youth may not yet qualify. In contrast, EPL-T should be relevant for many youth because it applies to fixed term work; however, it also insignificantly affects youth. Perhaps the Great Recession affected

youth primarily through channels other than the labor market. Excluding the youth group, the overall findings from Table 2 are consistent with the findings from Table 1 – unemployment support programs had a mitigating effect whereas employment protection programs had an exacerbating effect.

(insert Table 2 here)

6.3 Explaining employment protection effects

Employment protection exacerbated the impacts of the Great Recession on life satisfaction on net; however employment protection could have both positive and negative moderating effects by curbing unemployment but also by increasing stress in the labor market, as described in Section 3 and illustrated in Figure 2. In this section we assess both possible effects.

6.3.1 Benefits from reducing unemployment? To assess the potential positive moderating effects of employment protection on unemployment, we rerun the benchmark analysis including unemployment controls (micro and macro). When including unemployment controls the estimated effects of EPL and EPL-T represent the net effects after separately accounting for unemployment. If indeed EPL and EPL-T have positive moderating effects operating through curbing unemployment, then the net relations will have larger negative magnitudes.

Table 3 presents the results. When unemployment controls are included, the coefficient estimate for EPL is larger, supporting the view that EPL curbed unemployment and mitigated the effect of the Great Recession on life satisfaction operating through unemployment. However, the EPL-T estimates do not change in the expected way when unemployment controls are included. The exacerbating effects of EPL-T become statistically insignificant when unemployment controls are included. This finding implies EPL-T negatively affected life satisfaction through increased unemployment, not increased stress in the labor market. Employment protection legislation is intended to reduce unemployment but upon second glance, the result is not surprising. EPL-T does not directly limit the ability of firms to lay off workers, but limits their ability to use fixed term contracts, which likely reduces hiring, especially during volatile economic periods. Note stress from labor market conditions was still negatively affected by EPL-

T, but only for those aged 25-44 (Column 8), which makes sense as a group that is likely to take temporary positions.

(insert Table 3 here)

6.3.2 Cost of labor market rigidity - negative feelings about future job situation. We expect stricter employment protection to negatively affect individuals' stress from labor market conditions through perceptions of reduced employment opportunities (as illustrated in row 2 of Figure 2). To test this expectation, we introduced a new dependent variable reflecting how people feel about their ability to find a new job, or if they are employed, their worries about becoming unemployed. The variable is based on responses to the question, "What are your expectations for the next twelve months: will the next twelve months be better, worse or the same, when it comes to [Your personal job situation]?" The variable takes the value of 1 if the respondent chooses "worse" and 0 otherwise. Using this variable we rerun the regressions using the same specification for the analyses presented in Tables 1 and 2. The second stage is OLS as before, meaning the regression coefficients reflect changes in the probability an individual reports they believe their job situation will get worse due to changes in the independent variables. The analysis uses a slightly smaller sample because some individuals in the main sample did not answer the job situation question.

The results are presented in Table 4. Stricter EPL significantly increased negative feelings about job prospects for people with at least a college education and those aged 45 – 64 (columns 1 and 2), but did not significantly impact the other groups' job concerns. The significant relations are in line with expectations, affecting the groups most likely to be affected in theory. EPL applies to non-fixed term contract work, jobs that college educated and older people are more likely to obtain. EPL-T did not have a significant effect on individuals' perceptions of job prospects.

(insert Table 4 here)

Collectively the results of Tables 3 and 4 help to explain why stricter employment protection is related to larger declines in life satisfaction. They suggest EPL exacerbated the negative effects of the Great Recession on life satisfaction in part by increasing stress associated with labor

market conditions. This effect presumably results from greater rigidities in the labor market that are imposed by employment protection policies. The results in Table 3 illustrate that the negative effects of EPL do not operate through unemployment, they are in fact larger when controlling unemployment, and in Table 4, EPL is shown to negatively affect at least some individuals' feelings about their future job situation (specifically, the college educated and those aged 45-64).

The results for EPL-T instead suggest it negatively affects life satisfaction by increasing unemployment. In Table 3, the exacerbating effects of EPL-T become insignificant when controlling for unemployment, and in Table 4, EPL-T does not affect individuals' feelings about their job situation.

6.4 Robustness checks

In this section we address two potential concerns with the analysis. First, we support the validity of the instrumental variable approach by providing assurance that the peak policy variables are excludable. Second, we provide evidence that the results are not too sensitive to country selection.

Additional instrumental variables are necessary to use overidentification tests to assess whether the peak policy variables are excludable. To generate additional instruments, we use the Lewbel (2012) method. This method uses heteroskedasticity in the data and higher order restrictions to generate instruments without introducing external data. While somewhat new, it has been used numerous times now: Lewbel (2012) documents papers as early as 2007, and more recently by (Denny and Oppedisano, 2013; Le Moglie et al., 2015; Kesavayuth and Zikos, 2017; Sarracino and Fumarco, 2018).

Using the Lewbel (2012) method, we generate the instruments as follows: (1) run a regression of our endogenous variable, $group_g X trough_t X policy_j$, on the other covariates from equation 1 and store the residuals, (2) de-mean the covariates and multiply them by the stored residuals.⁶ For example, instrument $Z_{gjt}^* = (Z_{igjt} - \overline{Z_{igjt}}) * \mu_{igjt}$, where Z_{igjt} is any subset of the covariates and μ_{igjt} are the stored residuals. The method relies on two key conditions. First, heteroskedasticity, which can be tested using the standard Breusch-Pagan test. The second

⁶ We use the user written command `ivreg2h` (Baum and Schaffer, 2012) to generate the instruments in STATA.

condition is untestable and relies on an assumption. Specifically, the residual from the first step above multiplied by the second stage residual of life satisfaction must be unrelated to the covariates used to generate instruments, formally: $cov(Z_{igjt}, \varepsilon_{igjt} * \mu_{igjt}) = 0$.⁷ For Z, we only use gender. Gender is chosen as the only additional variable because we only need one additional variable per endogenous variable to test the overidentification restrictions and gender is exogenously determined.⁸ We use gender instead of age because age is used as one of groups of interest. In this way, we generate three additional excluded instruments for each 2SLS regression, one for each endogenous variable (policy by group). For a further description of the approach, see Baum et al. (2013) and Lewbel (2012).

Table 5 presents the overidentification test results and new coefficient estimates based on the main analysis using the additional instruments. The results read the same as in Tables 1 and 2. The Hansen J p-value reports the overidentification test result. In each case, we fail to reject that the instruments are valid. We note, however, that the number of clusters (countries) is too small for the Hansen J test. In order to run the overidentification test, we clustered at the country-period level to double the number of clusters.⁹ However, the clustered standard errors were quite similar in both cases, providing some reassurance that the change does not affect the overidentification test.

The coefficient estimates are nearly identical to the main results, consistent with expectations. We expected them to be similar because peak policy strongly predicts trough policy in the main analysis, which means that adding additional instruments should not greatly affect the first and second stages. Across Tables 1 and 2, the lowest F-stat was nearly 24, more than double the often-used cut off value of 10 for weak instruments.

(insert Table 5 here)

⁷ For identification, the standard assumption $E(X\varepsilon) = E(X\mu) = 0$ is also maintained, with X representing all of the covariates other than the instrumented one.

⁸ Indeed introducing additional excludable instruments would weaken any findings that suggest peak policy is excludable. Overidentification tests apply to the full set of excluded instruments, and peak policy forms a smaller proportion of the set with more excluded instruments.

⁹ In order to run the Hansen test, we also partialled out the country fixed effects (dummies) to reduce the number of variables. This process is similar to performing a within transformation. The estimates are equivalent when using dummy variables or transforming the variables.

The overidentification results provide evidence that suggests peak policy is a valid instrument. And, as discussed in the methods section, conditional on predicted-trough policy, peak policy is likely to be excludable in the second stage. It is unlikely that policy makers changed labor market policies in anticipation of the Great Recession (indeed policy indicators are nearly the same in each period, cf., Appendix Table A1), and there is good reason to believe that trough policies are more relevant to individuals than peak policies.

The second concern is that the results depend on the sample of countries. We use the greatest number of countries for which life satisfaction and policy data are available, which causes the country samples to differ across policy measures. As a reminder, Appendix Table A1 summarizes the policy variables and illustrates which countries are in each sample. The samples are also comprised of a small number of countries, meaning the impact of one country's policy could greatly influence the estimates. A country could be an outlier because of an unusual experience during the Great Recession or because their policy was measured differently than in the other countries.¹⁰ Although the small number of countries (clusters) challenge is directly addressed using Wild Cluster Bootstrap method, which improves consistency and greatly reduces the influence of outliers, this method may not be very intuitive.

To further assess whether the main results are sensitive to country sample, we repeatedly rerun the main analysis omitting one country at a time. If the resulting estimates, one for each country, are not significantly different from the main results, then we can conclude the results are not sensitive to the inclusion of one country or another.

The results from this exercise are presented graphically in Figures 4 and 5. In each graph, the dark horizontal lines represent the original estimates of policy's effect on peak to trough change in life satisfaction for each group. The points in each graph represent each new estimate when omitting the labeled country. Confidence intervals at the 90% level are included for each new estimate.

The results from Figure 4 and 5 show that in the vast majority of times a country is omitted, the estimates do not significantly differ from the estimates presented in Tables 1 and 2. Furthermore, the statistical significance of the estimates rarely change when omitting a country.

¹⁰ The OECD was very careful to make policy variables comparable across countries, but there are differences in policy implementation across countries that are potentially missed by the policy variables included in this study. One example is the strictness of regulations governing access to benefits, which is not considered in NRR and ALMP.

For example, in Figure 4, Panel A, Less than High School, omitting Greece does yield a significantly lower estimate, but one that is still statistically different from zero. Occasionally an estimate is not statistically different from zero, but in each case it is not statistically different from the main result.

(insert Figure 4 here)

(insert Figure 5 here)

The estimates for NRR and ALMP are not sensitive to omitting countries. The estimates of the effects of EPL are somewhat sensitive to the inclusion of Ireland and Great Britain, and Turkey for EPL-T's estimates. In Figure 4, Panel C (EPL), Ages 15-24, omitting Ireland or Great Britain yields insignificant estimates. In Figure 4, Panel D (EPL-T), omitting Turkey in any age group yields insignificant estimates. Interestingly, the estimate decreases for those with the less than a high school education, but increases for each other group by education. In Figure 5, Panel C (EPL), Ages 25 – 44, omitting Ireland reduces the precision, yielding an insignificant result. In Figure 5, Panel D (EPL-T), omitting Turkey again greatly reduces the precision across all groups. Future research should look further into EPL-T in Turkey.

Although some estimates for EPL and EPL-T are sensitive to country selection, the results from the Wild Cluster Bootstrap methods indicate a consistent story. Consider, Figure 5, Panel D (EPL-T), Ages 15 – 24, omitting Turkey yields a highly insignificant result, yet when omitting the other countries, the estimates are marginally significant. In this case, the regression results using bootstrapping are insignificant (Table 2, column 4). In contrast, in Figure 5, Panel C (EPL), Ages 25 – 44, the estimates are more significant (except when omitting Ireland), and as a consequence, the bootstrapped regression results are significant (Table 3, Column 3).

7. Conclusion

This study contributes to our understanding of how labor market policy can mitigate, or exacerbate, the negative effects of a recession on well-being. The Great Recession had significant negative effects on the subjective well-being of nearly every population group assessed. Those with a college education represent the one exception; they were not significantly affected. What is more, the impacts were not equally felt across countries. Different countries

experienced the Great Recession to greater or lesser degrees depending on their labor market policies.

We find, individuals in countries with more generous unemployment support policies experienced the negative effects of the Great Recession to a lesser degree, generally confirming previous results in the literature (Carr and Chung, 2014; Wulfgramm, 2014). However, not all groups benefited from unemployment support. This study provides new evidence that youth (ages 15-24) experienced large and significant declines in subjective well-being during the Great Recession, but did not benefit from unemployment support policies. In stark contrast, employment protection legislation exacerbated the negative effects of the Great Recession for most population groups. This finding is important. Employment protection is intended to benefit employees, but during the Great Recession, any benefits for those who kept their jobs were outweighed by negative effects. We present suggestive evidence indicating unemployment increased during the recession as a result of stricter legislation governing the use of temporary contracts (EPL-T). Employment protection legislation that limits employee dismissals (EPL) operated through different mechanisms. Suggestive evidence indicates stricter employment protection legislation negatively affected life satisfaction by imposing greater rigidities on the labor market and thus affecting feelings about future job prospects.

We assessed the role of two groups of unemployment support policies: (1) the proportion of income that is replaced when an individual becomes unemployed (net replacement rate or NRR) and (2) programs to assist unemployed people to find new jobs (active labor market policies or ALMP). The findings indicate NRR has a more robust and larger mitigating effect than ALMP, which is relevant for the current debate in Europe on labor market policy. In recent decades there has been a shift from NRR unemployment insurance toward ALMP programs. However, the evidence presented here suggests this shift is in error, at least in terms of protecting individuals from the effects of recessions on subjective well-being. These findings are consistent with the findings of Wulfgramm (Wulfgramm, 2014), who comes to the same conclusion regarding NRR and ALMP. However, both this study and the study by Wulfgramm focus on short-term effects and the findings should not be extrapolated to the long term. It is possible that ALMP policies do have stronger long run outcomes.

If policy makers are interested in shielding their constituents from the harmful effects of recessions, then according to our results, they should consider a Denmark style approach to labor

market policy: impose minimal restrictions on the ability of firms to adjust their workforce, but provide generous support for people who become unemployed. For youth, however, labor market policies did not statistically moderate the effects of the Great Recession. New policies specifically targeting youth should be considered.

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Figures and Tables

Figure 1 Expected relationship between unemployment support programs and subjective well-being (SWB) during recession

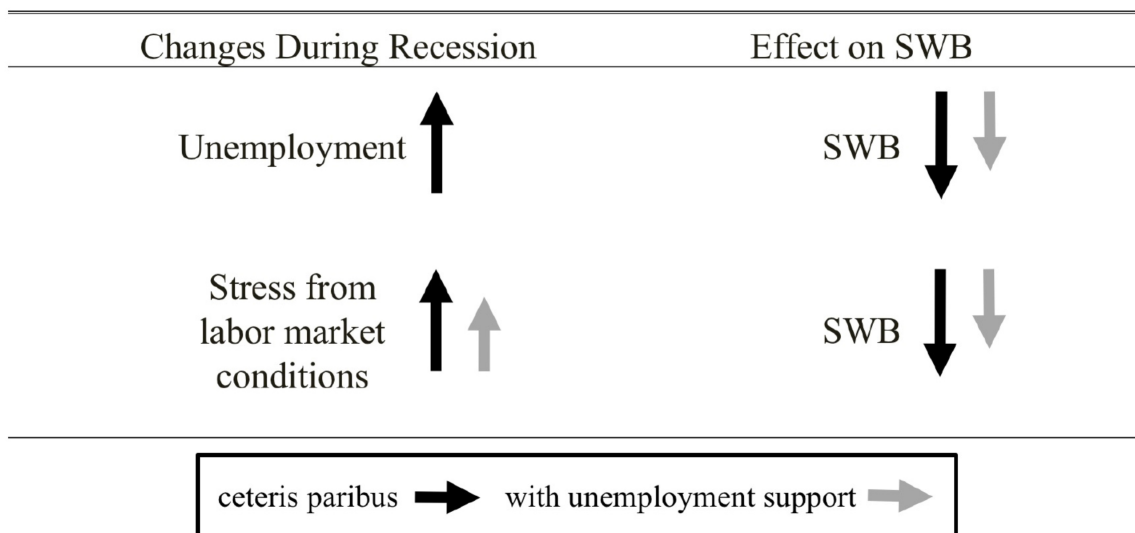


Figure 2 Expected relationship between employment protection legislation and subjective well-being (SWB) during recession

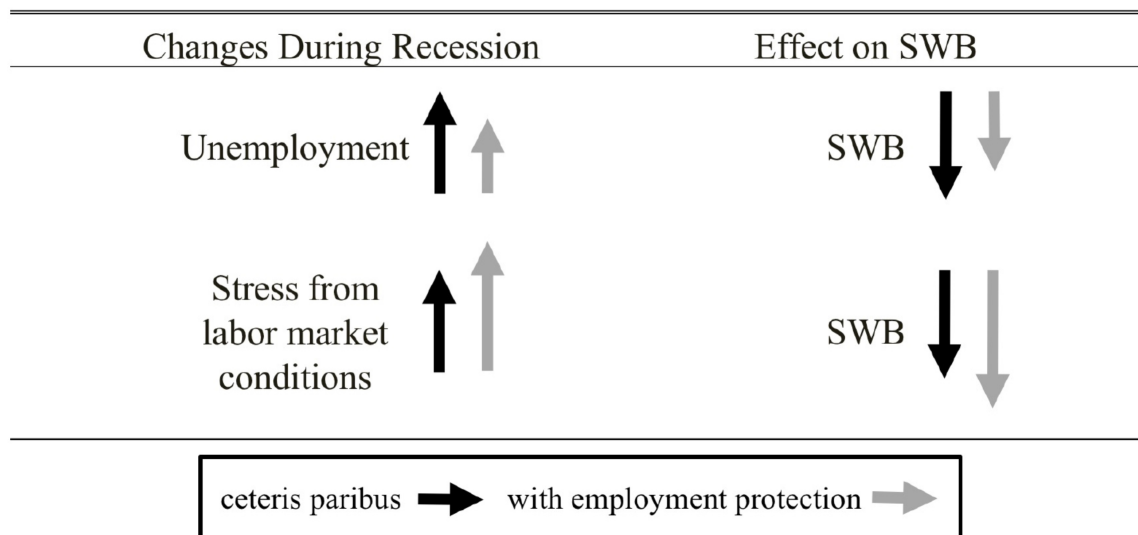
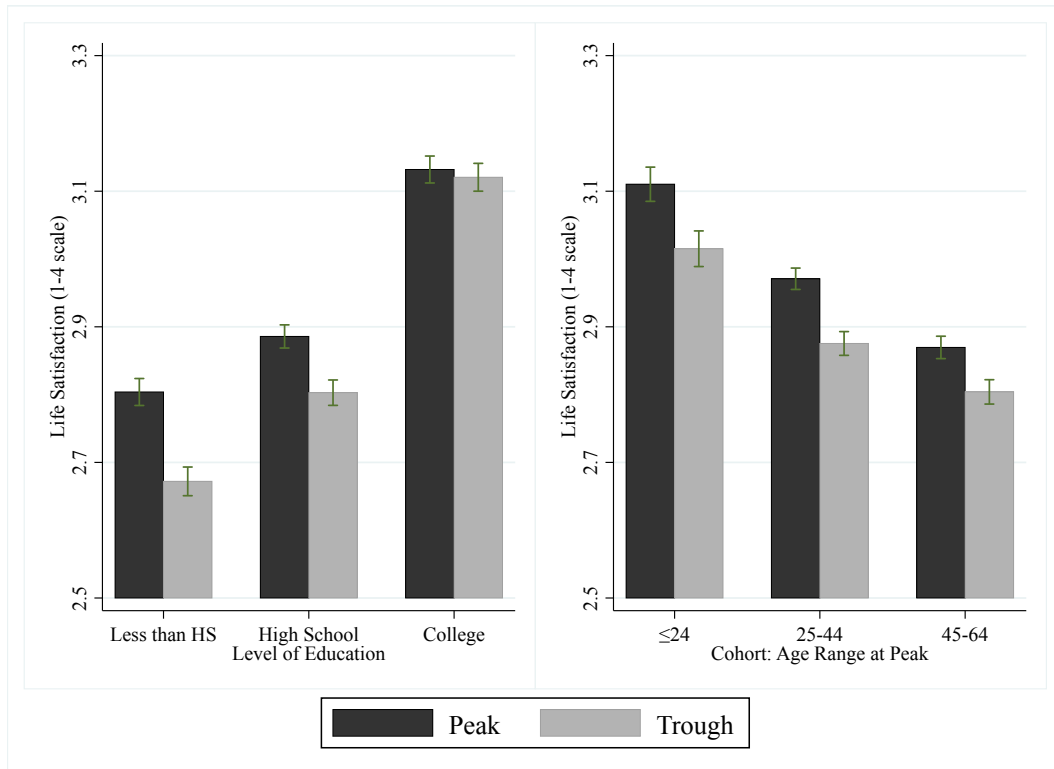
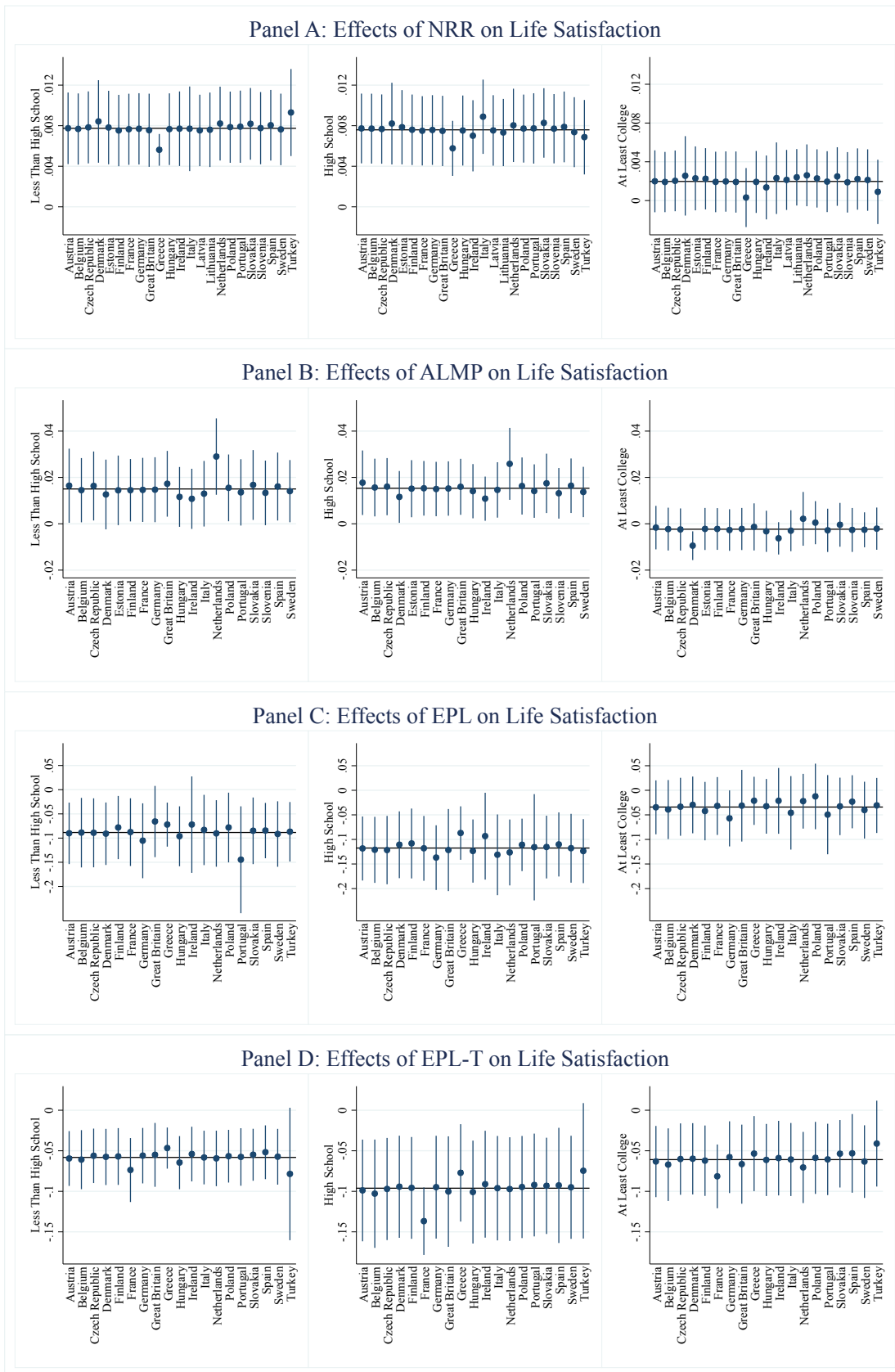


Figure 3 Mean changes in life satisfaction from peak to trough of the Great Recession, by group



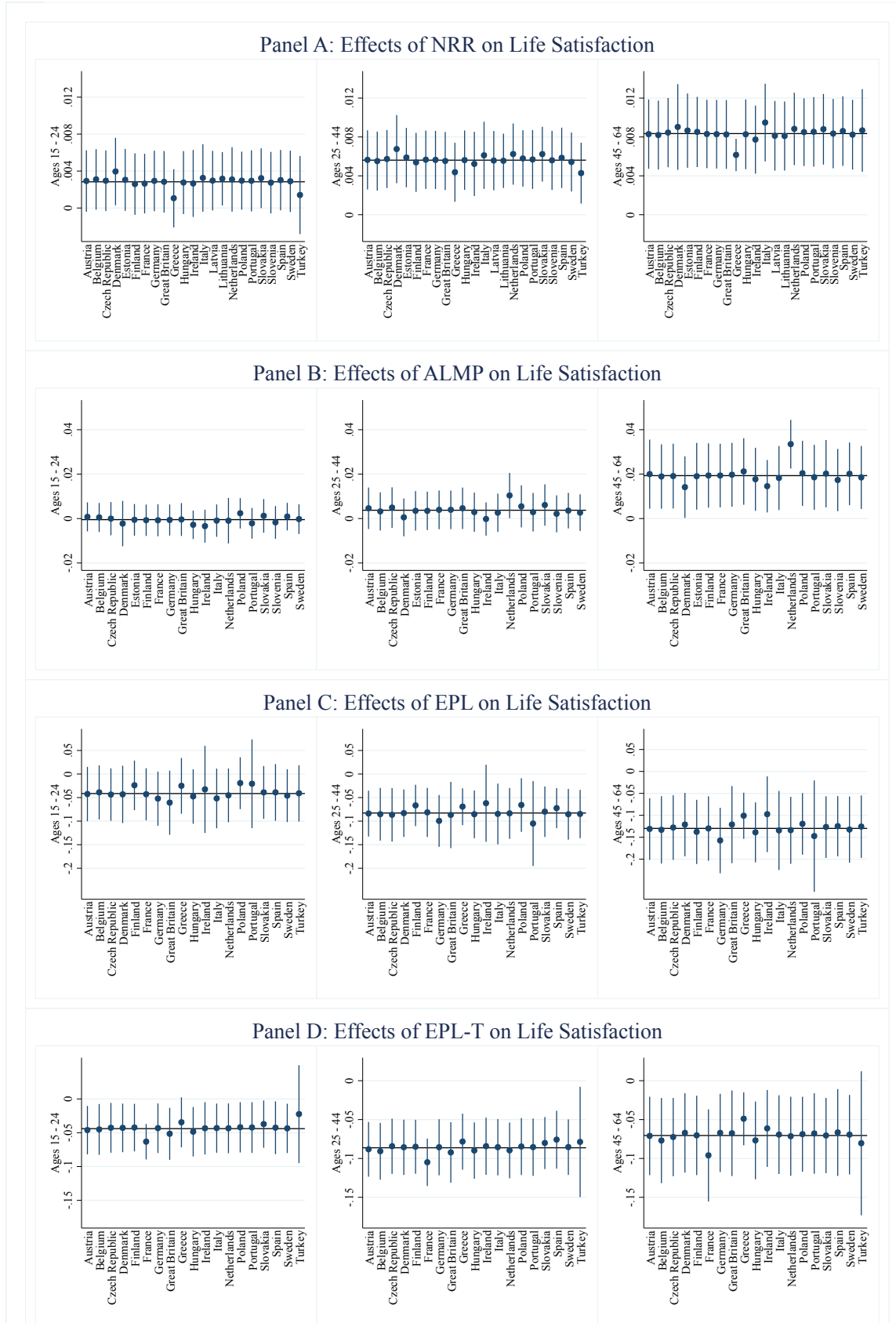
Notes: Mean life satisfaction of all 23 countries included in this analysis.

Figure 4 Sensitivity of results to omission of individual countries, groups by level of education



Notes: Each point represents parameter estimates using the same methods used in Table 1, but omitting a single country for each point. Countries across the X axis are omitted. The horizontal lines represent the original parameter estimates from Table 1. 90% confidence intervals are included for each estimate.

Figure 5 Sensitivity of results to omission of individual countries, groups by cohort



Notes: Each point represents parameter estimates using the same methods used in Table 2, but omitting a single country for each point. Countries across the X axis are omitted. The horizontal lines represent the original parameter estimates from Table 2. 90% confidence intervals are included for each estimate.

Table 1 Effects of policy variables on life satisfaction by level of education. Dependent variable: life satisfaction (1-4)

Policy Variable:	(1) NRR	(2) ALMP	(3) EPL	(4) EPL-T
Less than High School	0.008 [0.005]	0.015 [0.115]	-0.088 [0.028]	-0.058 [0.065]
High School	0.008 [0.003]	0.015 [0.078]	-0.118 [0.035]	-0.096 [0.083]
At Least College	0.002 [0.414]	-0.002 [0.732]	-0.034 [0.318]	-0.061 [0.080]
Mean Δ in Life Satisfaction				
Less than High School	-0.128	-0.084	-0.119	-0.119
High School	-0.079	-0.031	-0.057	-0.057
At Least College	-0.009	0.020	-0.000	-0.000
Beta Coefficients				
Less than High School	0.195	0.030	-0.121	-0.073
High School	0.197	0.034	-0.156	-0.095
At Least College	0.050	-0.007	-0.039	-0.053
Unemployment conts	yes	yes	no	no
Observations	33547	27792	28202	28202
Countries	23	19	19	19
R Sq.	0.251	0.248	0.232	0.234
Kleibergen-Paap F Stat.	265.760	23.437	137.235	30.235

2SLS regressions including controls for individual characteristics, macro variables, country fixed effects, and policy at trough instrumented with policy at peak. Policy units: NRR (0-100 scale); ALMP (1000s USD); EPL (0-6 scale); EPL-T (0-6 scale).

Bootstrap p-values in brackets

Table 2 Effects of policy variables on life satisfaction by cohort. Dependent variable: life satisfaction (1-4)

Policy Variable:	(1) NRR	(2) ALMP	(3) EPL	(4) EPL-T
Ages <= 24	0.003 [0.419]	-0.001 [0.910]	-0.041 [0.338]	-0.044 [0.361]
Ages 25 - 44	0.006 [0.053]	0.004 [0.561]	-0.083 [0.003]	-0.086 [0.038]
Ages 45 - 64	0.008 [0.000]	0.019 [0.073]	-0.130 [0.020]	-0.070 [0.063]
Mean Δ in Life Satisfaction				
Ages <= 24	-0.094	-0.051	-0.079	-0.079
Ages 25 - 44	-0.088	-0.044	-0.076	-0.076
Ages 45 - 64	-0.066	-0.024	-0.053	-0.053
Beta Coefficients				
Ages <= 24	0.058	-0.001	-0.044	-0.042
Ages 25 - 44	0.157	0.010	-0.118	-0.103
Ages 45 - 64	0.223	0.050	-0.172	-0.072
Unemployment conts	yes	yes	no	no
Observations	36879	30361	30781	30781
Countries	23	19	19	19
R Sq.	0.241	0.238	0.221	0.223
Kleibergen-Paap F Stat.	341.730	23.867	122.941	73.472

2SLS regressions including controls for individual characteristics, macro variables, country fixed effects, and policy at trough instrumented with policy at peak. Policy units: NRR (0-100 scale); ALMP (1000s USD); EPL (0-6 scale); EPL-T (0-6 scale)
Bootstrap p-values in brackets

Table 3 Effects of EPL and EPL-T on life satisfaction, with and without unemployment controls. Dependent variable: life satisfaction (1-4)

Policy Variable:	(1) EPL	(2) EPL	(3) EPL-T	(4) EPL-T	(5) EPL	(6) EPL	(7) EPL-T	(8) EPL-T
Less than High School	-0.088 [0.028]	-0.125 [0.005]	-0.058 [0.065]	-0.052 [0.135]				
High School	-0.118 [0.035]	-0.139 [0.018]	-0.096 [0.083]	-0.082 [0.175]				
At Least College	-0.034 [0.318]	-0.056 [0.120]	-0.061 [0.080]	-0.053 [0.105]				
Ages <= 24					-0.041 [0.338]	-0.071 [0.140]	-0.044 [0.361]	-0.032 [0.409]
Ages 25 - 44					-0.083 [0.003]	-0.113 [0.000]	-0.086 [0.038]	-0.078 [0.033]
Ages 45 - 64					-0.130 [0.020]	-0.151 [0.003]	-0.070 [0.063]	-0.064 [0.120]
Unemployment conts	no	yes	no	yes	no	yes	no	yes
Observations	28202	28202	28202	28202	30781	30781	30781	30781
Countries	19	19	19	19	19	19	19	19
R Sq.	0.232	0.249	0.234	0.249	0.221	0.239	0.223	0.240
Kleibergen-Paap F Stat.	137.235	133.732	30.235	28.540	122.941	117.525	73.472	61.621

2SLS regressions including controls for individual characteristics, macro variables, country fixed effects, and policy at trough instrumented with policy at peak. Policy units: EPL (0-6 scale); EPL-T (0-6 scale).

Bootstrap p-values in brackets

Table 4 Effects of EPL and EPL-T on perceptions of future job situation by level of education and cohort. Dependent variable: Job Situation Worse (Binary, Worse = 1)

Policy Variable:	(1) EPL	(2) EPL	(3) EPL-T	(4) EPL-T
Less than High School	0.015 [0.444]		0.018 [0.574]	
High School	-0.007 [0.584]		0.015 [0.679]	
At Least College	0.030 [0.053]		0.017 [0.353]	
Ages <= 24		-0.032 [0.145]		0.011 [0.837]
Ages 25 - 44		0.010 [0.456]		0.018 [0.589]
Ages 45 - 64		0.032 [0.030]		0.018 [0.343]
Observations	26400	28643	26400	28643
Countries	19	19	19	19
R Sq.	0.060	0.059	0.061	0.059
Kleibergen-Paap F Stat.	137.016	121.624	30.898	73.162

2SLS regressions including controls for individual characteristics, macro variables, country fixed effects, and policy at trough instrumented with policy at peak. No unemployment controls. Policy units: NRR (0-100 scale); ALMP (1000s USD); EPL (0-6 scale); EPL-T (0-6 scale)

Bootstrap p-values in brackets

Table 5 Effects of policy variables on life satisfaction by level of education and cohort with additional Lewbel generated instruments. Dependent variable: life satisfaction (1-4)

Policy Variable:	(1) NRR	(2) ALMP	(3) EPL	(4) EPL-T	(5) NRR	(6) ALMP	(7) EPL	(8) EPL-T
Less than High School	0.008 [0.005]	0.015 [0.113]	-0.088 [0.028]	-0.058 [0.065]				
High School	0.008 [0.003]	0.015 [0.078]	-0.117 [0.035]	-0.097 [0.080]				
At Least College	0.002 [0.411]	-0.002 [0.727]	-0.034 [0.318]	-0.061 [0.080]				
Ages <= 24					0.003 [0.419]	-0.001 [0.917]	-0.041 [0.338]	-0.044 [0.358]
Ages 25 - 44					0.006 [0.053]	0.004 [0.564]	-0.083 [0.003]	-0.087 [0.038]
Ages 45 - 64					0.008 [0.000]	0.019 [0.073]	-0.130 [0.020]	-0.070 [0.068]
Unemployment conts	yes	yes	no	no	yes	yes	no	no
Observations	33547	27792	28202	28202	36879	30361	30781	30781
Countries	23	19	21	21	23	19	19	19
R Sq.	0.251	0.248	0.232	0.234	0.241	0.238	0.221	0.223
Kleibergen-Paap F Stat.	194395	29311	327990	34352	255329	255329	255329	255329
Hansen J p-value	0.114	0.316	0.642	0.550	0.376	0.576	0.349	0.264

2SLS regressions including controls for individual characteristics, macro variables, country fixed effects, and policy at trough instrumented with policy at peak and Lewbel generated instrument. Policy units: NRR (0-100 scale); ALMP (1000s USD); EPL (0-6 scale); EPL-T (0-6 scale)

Bootstrap p-values in brackets

Appendix Table

Table A1 Peak and Trough Policy Variable Values, by Country

	<u>NRR (0-100 scale)</u>		<u>ALMP (1000s USD)</u>		<u>EPL (0-6 scale)</u>		<u>EPL-T (0-6 scale)</u>	
	Peak	Trough	Peak	Trough	Peak	Trough	Peak	Trough
France	55.64	57.00	3.93	3.38	2.73	2.67	3.63	3.63
Belgium	62.39	64.00	5.59	5.74	2.76	2.76	2.38	2.38
The Netherlands	68.49	68.13	12.98	12.84	2.92	2.87	0.94	0.94
Germany	55.63	55.55	3.06	4.17	3.09	3.09	1.00	1.00
Italy	22.68	24.73	2.14	1.63	3.15	3.15	2.00	2.00
Denmark	74.26	73.74	12.72	9.09	2.35	2.35	1.38	1.38
Ireland	70.32	73.05	5.68	2.61	1.91	1.91	0.63	0.63
Great Britain	50.92	49.90	2.21	1.69	1.68	1.68	0.38	0.38
Greece	27.87	29.38			2.93	2.93	2.75	2.75
Spain	50.63	49.79	2.70	1.29	2.76	2.76	3.00	3.00
Portugal	59.69	60.09	1.34	1.59	3.98	3.69	2.56	1.94
Finland	63.05	61.83	4.54	3.56	2.08	2.01	1.56	1.56
Sweden	62.37	61.28	6.25	3.64	2.58	2.58	1.44	0.81
Austria	54.89	54.59	5.54	5.86	2.62	2.62	1.31	1.31
Czech Republic	50.29	50.18	1.27	1.01	2.79	2.79	1.13	1.13
Estonia	38.13	39.84	0.25	0.28				
Hungary	45.55	46.62	0.82	0.79	2.40	2.40	1.13	1.13
Latvia	42.89	47.50						
Lithuania	35.04	43.13						
Poland	45.09	42.71	0.89	1.26	2.41	2.41	1.75	1.75
Slovakia	40.13	39.66	0.40	0.40	2.66	2.66	0.63	1.63
Slovenia	54.46	54.09	1.19	1.45				
Turkey	21.42	22.98			2.54	2.54	4.88	4.88
Mean	50.08	50.86	3.87	3.28	2.65	2.62	1.81	1.80
Std Dev	14.51	13.84	3.71	3.23	0.50	0.46	1.15	1.12
Max	74.26	73.74	12.98	12.84	3.98	3.69	4.88	4.88
Min	21.42	22.98	0.25	0.28	1.68	1.68	0.38	0.38

Sources: OECD Directorate for Employment, Labour and Social Affairs, Benefits and Wages: Statistics. Available at: <http://www.oecd.org/els/benefitsandwagesstatistics.htm>

OECD Public expenditure and participant stocks on LMP. Public expenditure as a percentage of GDP (Annual). Available at: stats.oecd.org

OECD (2014d) OECD Indicators of Employment Protection. Available at: <http://www.oecd.org/employment/emp/oecdindicatorsofemploymentprotection.htm>