Differences in Job Dissatisfaction across Europe

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ABSTRACT

Using the European Community Household Panel, this paper analyzes the determinants of job dissatisfaction in a European cross-country setting.

We find big differences in the reported job dissatisfaction across countries which seem due, at least in part, to cultural diversity. We explain job dissatisfaction by using variables measuring different job characteristics (earnings, job security, type of work, hours of work, working timing, working conditions and environment, and distance and commuting) and the rank by importance of these job characteristics seems quite similar across countries. Type of work and earnings are the most important determinants of job dissatisfaction in all countries.

Moreover, it seems that satisfaction measures with different job characteristics are more significant in explaining job satisfaction than objective measures. There are two potential explanations for this result. First, satisfaction measures may depend on personality traits and mood and this dependence can cause a spurious association between job satisfaction and other satisfaction measures. Second, job satisfaction is a relative measure and, as such, it is probably better explained by earnings, or other job characteristics, relative to a comparison level. Since satisfaction measures with different job characteristics are relative measures, they better explain job satisfaction.

NON-TECHNICAL SUMMARY

One of the most popular questions about happiness is: does money make people happier and, if yes, is it the main determinant of happiness? In this paper we try to answer to this question by looking at the relationship between earnings and job satisfaction in a European cross-country setting.

For our empirical analysis we use the European Community Household Panel Survey that provides comparable information on job satisfaction measures for 11 European Union countries (Austria, Belgium, Denmark, Finland, France, Greece, Ireland, Italy, the Netherlands, Portugal and Spain) covering the period 1994-2000. Each interviewed person is asked to report how satisfied he/she is in a six-point scale, from not at all satisfied (level one) to fully satisfied (level six).

Looking at people reporting a job satisfaction lower or equal than three, say dissatisfied people, we find substantial differences between countries. In Denmark and in Netherlands, for example, only 6.4% and 6.9% of people are dissatisfied with their jobs, whereas in Greece and in Italy the percentages increase to 29.6% and 38.6%. The differences in reported job dissatisfaction across countries seem in part explained by cultural diversity.

The factors explaining job dissatisfaction seem instead more similar across countries. We explain job dissatisfaction by using measures of satisfaction with seven different job characteristics: earnings, job security, type of work, hours of work, working timing, working conditions and environment, and distance and commuting. The ranking by importance of these job characteristics seems comparable across countries. Measures of satisfaction with the type of work and earnings are always among the most relevant explanatory variable in all countries. The least relevant explanatory variables are instead given by satisfaction measures with job commuting/distance, working times and number of working hours.

In conclusion, the estimated relationship between earnings and job satisfaction suggests that money can buy happiness.

1. Introduction

One of the most popular questions about happiness, addressed by economists and other social scientists, is: does money make people happier and, if yes, is it the main determinant of happiness? A few empirical studies have tried to answer to this question by estimating the relationship between income and life satisfaction[1] and, more in general, relationships between monetary and subjective measures of well-being, say money-happiness relationships. In this paper we verify whether earnings make people happier with their jobs and whether earnings are the main explanation to job satisfaction in different European countries.

Contradictory and puzzling results have been found in empirical studies examining the money-happiness relationship. Income (or earnings) seems to be a relevant factor, though not the only and not the main one, in explaining life (or job) satisfaction (see for a survey Frey and Stutzer, 2002a). But, while the income (earnings) tends to increase over the life cycle, the life (job) satisfaction does not seem to change significantly (see Easterlin 2001).

Social scientists have given different explanations for those puzzling results.

Psychologists and some sociologists believe that the satisfaction measures are mainly affected by personality traits rather than by monetary measures of wellbeing such as income or earnings (see Diener et al, 1999). If personality does not change much across time, then people are likely to report similar level of satisfaction along their life span. Personality characteristics, such as extraversion, neuroticism, optimism and self-esteem, are not usually observed in socio-economic surveys used in economic empirical papers. But, the availability of panel surveys have allowed economists to estimate individual effects models which control for time-invariant individual characteristics and in particular personality traits (see for example Winkelmann and Winkelmann, 1998; D'Addio et al., 2003; Ferrer-i-Carbonell and Frijters, 2004; and Frijters et al., 2004).

[1] In this paper satisfaction is defined as a self-reported subjective measure of wellbeing or happiness.

Some economists and sociologists believe instead that satisfaction depends mainly on income but only relative to a reference level for a comparison group (see Form and Geschwender 1962; Easterlin, 2001; Hamermesh, 1977 and 2001; and Clark and Oswald, 1996). This is because satisfaction is believed to be a relative measure. People compare themselves with other people and they are satisfied if they perceive to be better off than other people.[2] Those other people, say the comparison or reference group, may be siblings or close relatives, people with the similar characteristics, persons with the same investment in human capital, etc. Clark and Oswald (1996) suggest, for example, that people compare their income with the expected income for a person with their same education, job characteristics, age, sex and marital status. In Form and Geschwender (1962) the reference group is given by people with a common social background defined by the characteristics of parents and/or siblings. Easterlin (2001) suggests instead that the comparison is based on the past income trajectory. An increasing income trajectory implies a rise in aspirations, or in other words an increase of the income reference level, and a relative decrease in satisfaction.

Defining how and with which reference group people compare themselves can be quite doubtful and arbitrary. What does seem instead clear is that life (or earnings) satisfaction is a relative measure and we need to explain it with relative rather than absolute measures of different life (or job) characteristics. So, for example, to explain job satisfaction we need to consider relative measure of earnings, security, type of work, hours of work, working conditions, etc. While it is possible to define relative measures of earnings, although arbitrary, it seems much more difficult to define plausible relative measures of security, type of work or work conditions. Considering satisfaction with different life (or job) domains is then the more obvious solution to avoid adopting arbitrary definitions of relative measures. Satisfaction with different job domains reported by interviewed people is presumably a relative measure with respect to a reference group implicitly self-defined by the interviewees.

[2] Among economists, psychologists and sociologists thinking implicitly or explicitly to satisfaction as a relative measure are Easterlin (1974) and (1995), Form and Geschwender (1962), Hamersmesh (1977) and (2001), Veenhoven (1991), Diener et al. (1999) and Frey and Stutzer (2002b).

Economists usually prefer to use objective variables to explain life (or job) satisfaction. But, recently, Sousa-Poza and Sousa-Poza (2000), van Praag et al. (2003), Namkee and Garcia (2004) and van Praag and Ferrer-i-Carbonell (2004) have used subjective measures too. In particular, they have tried to explain general life (or job) satisfaction as an aggregate of more specific satisfaction measures with different life (or job) domains. From their empirical results it seems that subjective measures are much more relevant in explaining satisfaction than any objective variable. But these results must be considered with some caution. The strong relationship found between satisfaction variables could be spurious if induced by personality traits or mood. Van Praag et al. (2003) and van Praag and Ferrer-i-Carbonell (2004) control to some extent for unobserved personality traits but not for mood. In our paper we explain general job dissatisfaction by using as explanatory variables mainly subjective measures of satisfaction with different job domains and we take account of the possible endogeneity problem caused by both personality characteristics and mood.

As in Winkelmann and Winkelmann (1998) we use fixed effect logit models to explain satisfaction but we focus attention on the bottom tail of the satisfaction distribution, i.e. we try explaining why some people have a very low level of satisfaction, say dissatisfaction. D'Addio et al. (2003), Ferrer-i-Carbonell and Frijters, (2004) and Frijters et al. (2004) explain instead different levels of satisfaction using a fixed effect ordered logit models. Our interest in explaining a job dissatisfaction dummy is in part motivated by the fact that dissatisfied people are more likely to be subject to serious consequences, such as quitting their job, productivity reduction, absenteeism, and health problems; and in part motivated by the fact we want to relax some of the assumptions imposed by fixed effect ordered logit models.[3]

For our empirical analysis we use the European Community Household Panel Survey (ECHP) which provides comparable panel data on job satisfaction for 11 European Union countries covering the period 1994-2000. The ECHP collects

[3] In particular we want to allow both intercept and slope coefficients to change for different levels of satisfaction.

information on general job satisfaction and satisfaction with seven different job domains such as earnings, job security, type of work, hours of work, working timing, working conditions and environment, and distance and commuting. Each interviewed person is asked to report how satisfied he/she is in a six-point scale, from not at all satisfied (level one) to fully satisfied (level six). Looking at people reporting a job satisfaction lower or equal than three, say dissatisfied people, we find substantial differences between countries. In Denmark and in Netherlands, for example, only 6.4% and 6.9% of people are dissatisfied with their jobs, whereas in Greece and in Italy the percentages increase to 29.6% and 38.6%.

One of our research questions is then to investigate whether those differences reflect a cultural bias in answering to survey questions or a different economic context across countries. As emphasized by Ostroot and Snyder (1985), Veenhoven (1987), Diener et al. (1991) and Veenhoven (1996), we can expect that differences in satisfaction across countries be in part due to differences in the language used in the survey questions, in social desiderability perception, and in importance, propriety and moral valence of happiness. Those cultural diversities may then reflect in a different rescaling of the satisfaction measures across countries and perhaps even in a different impact of determinants of satisfaction. To take account of the possible different rescaling we consider two approaches.

The first approach considers two different measures of job dissatisfaction: one defined at European level and one rescaled at national level. More precisely, we define unsatisfied people as the persons who report a level of satisfaction below the tenth percentile for Europe as a whole or below the national equivalent tenth percentile. Then, we test whether the rescaling of the job dissatisfaction measure at national level produces more similar coefficients across countries when estimating a job (dis)satisfaction model.[4] If the coefficients are more similar, we conclude that differences across countries are in part due to a cultural effect.

[4] A rigorous comparison of the explanatory variables coefficients across countries is not straightforward. The coefficients in models for categorical variables are identified only up to a scale factor (see Allison,

In the second approach, instead, we explain the job dissatisfaction dummy defined at European level by using equivalently defined dissatisfaction dummies with different job domains. Let us assume that cultural diversities cause a different rescaling of satisfaction measures across country and a same rescaling for different satisfaction measures within countries. Moreover, let as assume that relationships between satisfaction variables are unaffected by change in the scale, provided that the same scale is applied to all variables. Then using dissatisfaction dummies defined at European level, for both general job satisfaction and satisfaction with different job domains, should reduce differences in the coefficients across countries caused by a cultural diversity.

The rest of the paper is organized as follows. Section 2 describes the main issues in modelling job satisfaction. Section 3 reviews some of the previous papers comparing satisfaction across countries. Section 4 describes the data source used for the empirical application, the ECHP, and defines the sample and the variables used. Section 5 presents the job dissatisfaction model and its estimates for 11 European countries. Section 6 introduces a new test for the equality of coefficients in a fixed effect logit model between groups and applies it to compare the job dissatisfaction models between European countries. Finally, Section 7 gives some conclusions.

2. Main issues in modelling job satisfaction

In this section we discuss some of the main issues in modelling job satisfaction: the satisfaction heterogeneity due to personality traits and mood, and the problem of choosing between subjective and objective measures as explanatory variables for satisfaction.

Psychologists usually distinguish between two aspects of subjective well-being: cognition, which is the rational aspect; and affect, which is the emotional one (see Lucas et al., 1996). Self-reported measures of satisfaction are believed to reflect mainly a

1999) and the scale factor can change across countries. For this reason we propose a new test to compare fixed effects logit model coefficients between groups.

cognitive aspect but they could also reflect an emotional aspect of well-being (as for example mood) and personality traits (as for example extraversion, neuroticism, optimism and self-esteem). In micro-econometric models explaining satisfaction the residual errors may then reflect measurement errors linked to mood and personality traits. These residual errors could be correlated with the explanatory variables and causing an endogeneity problem. This problem can be especially serious when using as explanatory variables subjective measures which are also likely to be affected by personality characteristics and mood.

If repeated observations for the same individuals are available and the endogeneity problem is due only to time-invariant unobserved individual characteristics, in particular personality traits; then the endogeneity problem can be controlled considering individual fixed effects as in Winkelmann and Winkelmann, (1998), D'Addio et al. (2003), Ferrer-i-Carbonell and Frijters (2004), and Frijters et al. (2004). Van Praag et al. (2003) and van Praag and Ferrer-i-Carbonell (2004) prefer instead to use random effects models and control for the possible endogeneity problem caused by personality traits by a cumbersome procedure, which does not guarantee to solve completely the endogeneity problem.[5]

Even after controlling for individual fixed effects, we can still have an endogeneity problem because the residual error may be correlated with the mood which is a time-variant characteristic. Then, controlling for a measure of emotional well-being, say mood, can be the way to solve the remaining endogeneity problem.

Psychologists, sociologists and economists usually agree in considering self-reported measures of satisfaction as relative measures with respect to a comparison group (see for example Easterlin 1974, 1995; Form and Geschwender, 1962; Hammersmeth, 2001; Veenhoven, 1991 and Diener et al. 1999). As emphasized by Frey

[5] They explain life (or job) satisfaction by using self-reported satisfaction measures with different life (or job) domains, a complex control variable for endogeneity and random effects. They estimate separate equations for each satisfaction domain and predict an individual effect component for each domain. They then compute the first principal component of the covariance matrix of those individual effects (which explains 50% of the total variance) and use it as additional explanatory variable, control variable, in the general satisfaction model.

and Stutzer (2002b), "[t]here is little doubt that people compare themselves to other people and do not use absolute judgments. But it is crucial to know with *what* other people such a comparison is being made." Trying to find an answer to that question, psychologists have concluded that the way people compare themselves with others is probably heterogeneous across people and linked to personality traits (see Diener et al. 1999). Some sociologists and economists have instead tried to define comparison groups unrelated to personality characteristics (see for example Form and Geschwender 1962; Clark and Oswald, 1996; Hamermesh, 2001)

In general, we can think that people compare their absolute satisfaction with a predicted absolute satisfaction for their reference group, say comparison satisfaction. This comparison satisfaction could be a prediction based on a set of family background and personal characteristics. Then people should report to be satisfied when their absolute satisfaction is higher than the comparison satisfaction. Nevertheless, people may differ in their perception of satisfaction because of heterogeneity in personality traits. In particular, optimistic people are more likely to report high values of satisfaction, while pessimistic people probably report low values. To reflect this heterogeneity across individuals we can assume that the reported level of satisfaction is given by the difference between absolute satisfaction and comparison satisfaction plus an individual component unchanged across time, say individual effect.

If people compare their absolute level of satisfaction with the one predicted for a potential comparison person with the same background and personal characteristics, then their reported level of satisfaction is net of the effect of those characteristics. Therefore, those background and personal variables are likely to be scarcely significant in explaining satisfaction. Conversely, individual effects are likely to be very significant because of the personality heterogeneity across individuals. This conclusion is supported by empirical papers in sociology and psychology (see Diener et al., 1999, for a review), which find that personality characteristics are the strongest predictors of satisfaction whereas socio-demographic variables are usually weaker predictors.

Since it is unlikely that people update instantaneously their comparison group when they experience some bad or good changes or major life events (ex. promotion, getting married, unemployed, divorce, children birth), changes are probably relevant in explaining satisfaction. But, in the long term, changes should not affect satisfaction because people adapt their aspirations or, in other words, they update their comparison group.[6]

Summarizing, objective life (or job) characteristics are not strong predictors of general life (or job) satisfaction because they are not relative measures. The empirical application in Clark and Oswald (1996) supports this conclusion. They find that job satisfaction depends on income relative to a comparison group. It seems therefore that the best way to explain life (or job) satisfaction is by considering relative measures. Satisfaction measures with different life (or job) domains are presumably relative to a comparison group self-defined by the interviewed people.

Sousa-Poza and Sousa-Poza (2000), van Praag et al. (2003), Namkee and Garcia (2004) and van Praag and Ferrer-i-Carbonell (2004) use satisfaction measures with different life (job) domains to explain general life (job) satisfaction and find that those explanatory variables are much more significant than objective measures. The high significance of subjective measures is also confirmed by more traditional empirical studies, which explain life (or job) satisfaction mainly with objective measures and few subjective measures, such as self-reported health measures (see for example Gerdtham and Johannesson, 2001; Ferrer-i-Carbonell and Frijters, 2004; and Kaiser, 2005).

If we were able to estimate separate models for classes of people with a common comparison group, then the objective measures would probably be more significant in explaining satisfaction. This would require the estimation of a satisfaction model which allows for heterogeneity in the coefficients across classes. Clark et al. (2005) try to control for heterogeneity in the coefficients by dividing people into classes. More precisely, they use the ECHP and a latent class technique to estimate an ordered probit

[6] For an evaluation of life events on happiness we refer to Clark and Oswald (2002) and Blanchflower and Oswald (2004).

model for satisfaction with financial situation allowing for heterogeneity in the intercept and in the income coefficient between classes. They estimate the probability of belonging to different classes by a multinomial logit model using as explanatory variables socio-demographic variables (dummies for country of residence, gender, marital status, education, age and number of children). If the classes identified in Clark et al. (2005) define categories of people with similar comparison groups, then the results in Clark et al. support our conjecture that coefficients of objective variables are heterogeneous across people with different comparison groups.

3. Short review of studies comparing job satisfaction across countries

Several macro studies try to explain differences in satisfaction across countries by relating national satisfaction measures with national socio-economic indicators. Diener et al. (1995) is one of the most complete cross-country macro studies of satisfaction. They consider 55 countries and analyze the relationship between satisfaction in each country and a set of potential indicators of the cultural and socio-economic environment. Those predictors go from income measures to indicators of human rights possession, and from inequality measures to scores ranking the nations in terms of individualist versus collectivist culture. Diener and Suh (1999) recognize that the choice of nations as unit of analysis may be inadequate when heterogeneity in satisfaction is higher within countries than between countries. Micro analyses allow us, instead, to explain differences in satisfaction between people by differences in their personal characteristics. Moreover comparing micro models for satisfaction across countries allow us to verify whether the impact of the satisfaction determinants differ across countries, or in other words, whether two people with the same characteristics but living in two different countries report the same level of satisfaction. Nevertheless, micro analyses, as well as macro analyses, do not provide the final answer to all questions. If identical people living in different countries are likely to report different levels of satisfaction, then this difference may be due to unobserved heterogeneity

across countries and in particular to different cultures, which micro models do not control for.

In this paper we analyze the micro-relationship between job (dis)satisfaction and macro economic and personal characteristics for a set of European countries. Namkee and Garcia (2004), Albert and Davia (2005) and Kaiser (2005) have already considered micro-models of job satisfaction for different European countries using the same data source used in this paper, the ECHP. Sousa-Poza and Sousa-Poza (2000) have instead estimated micro-models of job satisfaction for 21 countries (including Western and Eastern European countries, Israel, Japan, New Zealand and United States) by using the International Social Survey Program (ISSP).

Albert and Davia (2005) explain job satisfaction using a linear regression model with fixed effects and consider as explanatory variables mainly objective measures except for a couple of self-reported measures about health and over-qualification. Namkee and Garcia (2004) use again linear regression models without fixed effects and consider two different model specifications: one with mainly objective measures, except again subjective measures of health and over-qualification, and one with only subjective measures of satisfaction with different job domains. Linear regression models are not very adequate to explain satisfaction. In particular they impose that the reported satisfaction measure is cardinal instead than ordinal.

Kaiser (2005) uses instead an ordered probit model to explain job satisfaction with a set of objective measures, except a measure of subjective health, but, as Namkee and Garcia (2004), he does not control for individual effects. Considering individual fixed effects is important because the perception of satisfaction is heterogeneous across individuals and depends on personality traits and other time invariant personal characteristics which are usually unobserved. Moreover, when considering subjective well-being measures as explanatory variables (such as health measures or satisfaction with different job domains) there can be an endogeneity problem.

Finally, Sousa-Poza and Sousa-Poza (2000) estimate separate ordered probit for 21 countries using work orientation data from the ISSP. The ISSP provides comparable

data on job satisfaction across countries but does not provide repeated observations for the same individuals. For this reason they cannot control for unobserved personality traits and other time invariant personal characteristics. Unfortunately this is a big limit especially when estimating relationships between job satisfaction and other subjective measures, as Sousa-Poza and Sousa-Poza (2000) do. As explained before, job satisfaction and other subjective measures can be spuriously related because they all depend on personality characteristics.

4. Data

4.1 Sample description

The European Community Household Panel (ECHP) is a standardised multi-purpose annual longitudinal survey carried out for the 15 European countries belonging to the European Union (EU). It was centrally designed and coordinated by the Statistical Office of the European Communities (Eurostat).[7] The target population of the ECHP consists of all individuals living in private households within the EU. In its first (1994) wave, the ECHP covered about 60,000 households and 130,000 individuals aged 16+ in 12 countries of the EU (Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and the UK). Austria, Finland and Sweden began to participate later, respectively in 1995, 1996 and 1997. For Germany and the UK two different panel surveys run in parallel, the national household panel survey (the German Socio-Economic Panel and the British Household Panel Study) and the European Community Household Panel. For those two countries we do use neither the national panel surveys nor the European Community Household Panel. This is because the national panel surveys do not provide some of the job satisfaction variables used in our analysis, whereas the ECHP is only three years long in Germany and the UK. We also exclude Luxembourg because of the small sample size and Sweden because the job

[7] We refer to Peracchi (2002) and Eurostat (2003) ECHP-UDB manual for a detailed description of the ECHP.

satisfaction variables are not available. We therefore consider Austria, Belgium, Denmark, Finland, France, Greece, Ireland, Italy, the Netherlands, Portugal and Spain.

Since job satisfaction and more in general life satisfaction have been shown to vary by age, sex and to be affected by life events such as getting married or divorce (see, for example, Clark et al. (1996), Clark (1997) and Clark et al. (2003)) we limit our analysis to the subsample of men working at least 15 hours a week, married or cohabiting and aged between 25 and 54. This subsample is chosen in order to limit the heterogeneity of the sample such that an examination of country differences could be focused upon.

Individuals with missing information in specific waves were dropped for the specific waves but retained in waves in which all job satisfaction questions were answered. The percentage of missing cases for each of the job satisfaction variables is never higher than four percent.

4.2 Variable descriptions

In our empirical analysis we compare job satisfaction across Europe and assess the importance of different job satisfaction domains on the general level of job satisfaction. In particular, we consider the following job satisfaction domains: earnings, job security, type of work, number of working hours, working times (daytime, night time, shifts, etc.), working conditions and environment, and job commuting and distance. The satisfaction with different job domains is a self-reported ordinal variable taking six values, from (1) not at all satisfied to (6) fully satisfied. With regard to general job satisfaction, respondents are asked, "all things considered", to rate their satisfaction with their job or current main activity on the same type of ordinal scale as used to assess the aforementioned domains of working life. We report the mean of those ordinal satisfaction measures and their standard deviation in Table 1, where we can notice that Italy, Greece, Spain and Portugal are the countries with the lowest average level of job satisfaction as well as the lowest average levels of satisfaction with different job

domains, while Denmark, Netherlands and Austria are the countries with the highest average levels of satisfaction.

We also consider the effect on the general job satisfaction of other job-related variables, some household and personal characteristics and two macro economic indicators.

In particular, we consider the following job related characteristics: dummies variables for public sector, for supervisory role, for working part-time (less than 35 hours a week), and for over-qualification. We classify people as overqualified when they answer in the affirmative to the following question "Do you feel you have skills or qualifications to do a more demanding job than the one you have now?".

The household and personal characteristics we consider are instead: dummies for presence of zero, one and two or more children (persons below 16) in the household, household size, age, age square, health and mood. The health variable used is a subjective measure reported directly by people on a scale from 1 (very good) to 5 (very bad). The mood measure is instead computed as the difference between the self-reported health and the best linear predictor of health given a set objective health indicators and individual fixed effects. The set of objective health indicators are: a dummy for people hampered in their daily activities, a dummy for cut down of usual activities because of illness or injuries in last two weeks, a dummy for cut down of usual activities because of emotional or mental health problems in last two weeks, a dummy for admission as in-patient to a hospital in last 12 months, number of nights spent in hospital in last 12 months, number of consultations with a general practitioner in last 12 months, number of consultation with a specialist, number of consultation with a dentist, number of consultations with any medical professionals. The mood variable seems to be correlated with all types of satisfaction measures and especially with general job satisfaction and satisfaction with working conditions and type of work.

Finally we consider two macro-economic indicators, unemployment and economic growth rates, which reflect economic environment conditions possibly affecting job satisfaction.

Mean and standard deviations for the job related, household, personal and macro economic variables are reported by country in Table 3.

Looking at Figure 1 we can notice that people reporting a level of satisfaction lower than two are less than 2% in Denmark and the Netherlands and more than 10% in Italy and Greece. It seems therefore that in some countries people tend to use a restricted range of values for satisfaction avoiding almost completely the lowest levels. In particular people in Italy and Greece seem to use a satisfaction scale extended on the full range of six possible values; while people in Denmark and the Netherlands use a restricted scale of values, say from three to six. A level of satisfaction equal to 3 is relatively very low for Denmark and the Netherlands and is relatively medium for Italy and Greece.

We wonder then if it would be better to rescale the job satisfaction measure differently across countries. For this reason we define two different dummy variables to identify people with low levels of job satisfaction, say people who are job dissatisfied: 1) a dummy variable taking value of one for people whose level of job satisfaction is below the tenth percentile for Europe as a whole, and 2) a dummy variable taking value one for people whose level of job satisfaction is below their national tenth percentile. The same types of dissatisfaction dummies were also constructed for each job satisfaction domain.

In Table 2 we report the national 10-th percentiles and the European 10-th percentile of the general job satisfaction. In Denmark, the Netherlands and Austria the percentage of people with a level of satisfaction lower or equal to three, the European 10-th percentile, is less than 10%, and their national 10 percentile is equal to 4. In Italy and Greece the percentage of people with a level of satisfaction lower or equal to three is far higher than 10%, respectively 29.6% and 38.8%, and their national 10-th percentile is equal to 2. For all the remaining countries instead their national 10-th percentile is equal to the European 10-th percentile, which is three. In conclusion, the European job dissatisfaction dummy is a variable equal to one for people reporting a level of job satisfaction lower or equal to three; whereas the national job dissatisfaction dummy is

equal to 1 for people reporting a level of satisfaction lower than two in Italy and Greece, lower then four in Denmark the Netherlands and Austria and lower than three in all other countries. Notice that the job dissatisfaction should have a theoretical mean equal to 0.10 but, since the job satisfaction measure is not continuous, the dummies can have quite different mean across countries. The means for the European dissatisfaction dummies range from 0.064 for Denmark to 0.386 for Greece, whereas the national dissatisfaction dummies have means ranging from 0.116 for Greece to 0.301 for Denmark, see Table 2.

Finally, we compare job and house satisfaction histograms (see Figures 1 and 2) and we find that they have very similar profiles within countries while they change substantially across countries. Since bad (good) labour market conditions observed in a specific country do not imply necessarily equally bad (good) house conditions for the same country, the strong similarity between labour and house satisfaction histograms within countries is likely to be caused by a cultural bias in answering to satisfaction questions. This result is confirmed also by our empirical micro analysis where we find that macro variables describing the economic context in different countries are not relevant in explaining job satisfaction.

5. Job (dis)satisfaction model

In this section we model the probability of being dissatisfied (below the tenth percentile) with one's present job by using a set of ordinal categorical variables measuring the level of satisfaction (from one to six) with different job domains. The job domains considered are: earnings, security, type of work, number of working hours, working times (daytime, night time, shifts, etc.), working conditions and environment, and job commuting and distance. Moreover, we control for a set of additional variables, which may affect job satisfaction: job related variables, household and personal

variables, and unemployment and economic growth rates. Descriptive statistics for the variables used in our job dissatisfaction models are presented in Table 3.[8]

We estimate two logit models; one using dissatisfaction dummy variables defined at European level and another one using dissatisfaction dummy variables defined at national level. In both cases we estimate the models separately by country, pooling observations across waves.

The logit model imposes the following linear relationship between the propensity to be dissatisfied with one's present job (which is an unobserved continuous variable), say y^*, and the vector of explanatory variables, say X,

$$y^*_{i,t} = X_{i,t}\beta + \varepsilon_{i,t} \tag{1}$$

where $i=1,\ldots,n$ is the index for individuals, $t=1,\ldots,T$, is the time index and $\varepsilon_{i,t}$ are the error terms identically and independently distributed as logistic with zero mean and variance $(\pi^2)/3$. The job dissatisfaction dummy, say $y_{i,t}$, is linked to the latent propensity to be dissatisfied, $y^*_{i,t}$, by the following relationship:

$$y_{i,t} = I\{y^*_{i,t} > 0\}, \tag{2}$$

where I{A} is the indicator function of the event A.

Since we cannot observe personality traits in the ECHP, we try to control for at least the time invariant personality characteristics by considering individual fixed effects logit models:

$$y^*_{i,t} = X_{i,t}\beta + \alpha_i d_i + \varepsilon_{i,t} \tag{3}$$

[8] We have also tried different specifications for the job dissatisfaction model, in particular we have considered two different set of explanatory variables: (1) five dummies for different satisfaction levels for each job domain and four dummies for people dissatisfied with one, two, three, and four or more domains of job satisfaction and (2) a polynomial of degree two for each of the categorical variables measuring satisfaction with different job domains. Increasing the number of variables improves just slightly the goodness of fit. Therefore, we adopt the more parsimonious specification described above.

where α_i is a coefficient for a dummy variable, d_i, taking value one for the i-th individual and zero otherwise. We avoid to estimate the n coefficients α_i by considering the joint distribution of $(y_{i,1},...,y_{i,T})$ conditional on the explanatory variables and $\sum_{t=1}^{T} y_{i,t}$, which does not depend on α_i (see Chamberlain, 1984). Moreover we control for the possible endogeneity of satisfaction measures by adding a proxy measure of mood as explanatory variable (see Section 3.2 for a more precise definition).

In Table 4 we present the estimation results for the fixed effect logit model separate by country and using the job dissatisfaction dummies defined at European level and at national level. Notice that the dissatisfaction dummies with different job domains (see Wald tests in Table 5) are very important to explain the general job dissatisfaction whereas the remaining control variables (job-related variables, household and personal characteristics and unemployment and growth rates) are either insignificant or only slightly significant.

Theoretically, if the continuous variable, y^*, measuring the propensity to be dissatisfied were observed, we would be able to estimate the coefficients of the satisfaction variables with different job domains in two alternative ways: (1) by regressing y^* on the measures of satisfaction with different job domains, say X_1, and on the remaining explanatory variables, say X_2 ; or (2) by first regressing y^* and the satisfaction measures with different job domains on X_2 and then regressing the residual of the y^* regression on the residuals of corresponding regressions for each measure of satisfaction with different job domains. This result is proved by the Frisch and Waugh theorem.[9] The residual of the y^* regression can be thought of as a relative measure of job dissatisfaction given by the difference between y^* and the predicted y^* for a reference group with the same household, personal, job related and macro economic characteristics. Similarly, the residuals of the regressions for the satisfaction measures with different job domains can be also thought of as relative measures of satisfaction. If

[9] An equivalent result is valid when introducing individual fixed effects.

estimating the logit model with or without the additional variables X_2 give the same coefficients for the satisfaction variables with different job domains, then the job satisfaction measures used are independent of (or at least orthogonal to) the household, personal, job related and macro economic variables. This can be the case when reported satisfaction measures are relative measures and more specifically measures net of the effect of household, personal, job related and macro economic characteristics.

Since the Wald tests reported in Table 5 tell us that household, personal, job related and macro economic characteristics are not very significant, it seems plausible to conclude that job dissatisfaction measures reported in the ECHP are relative measures. While it could be argued that the irrelevance of the additional variables X_2 is due to multicollinearity problem between those variables and the satisfaction measures with different job domains, we find a low significance of the additional variables even when we exclude the satisfaction measures with different job domains from the model.

Looking at four different Wald joint significance tests in Table 5 respectively for the satisfaction measures, the job-related variables, the household and personal variables and the macro economic variables, we notice that the satisfaction measures are much more significant then the other variables. At 5% level of significance we do not reject the assumption of zero coefficients for the job-related variables only in Italy and Greece (and only when using the European definition of dissatisfaction), for the household and personal variables only for Denmark, Spain, Portugal and Austria, and for the macro economic variables only in the Netherlands, Belgium, Portugal and Austria.

6. Testing equality of coefficients across countries

6.1 Testing methodology for equality of coefficients between groups

Comparison of fixed effects logit models between groups, in our specific case between countries, is complicated by the fact that the coefficients are identified only up to a scale. Let us consider the following fixed effects logit model

$$q^*_{i,t} = X_{i,t}\gamma + c_i d_i + u_{i,t} \tag{4}$$

where $q^*_{i,t}$ is a latent continuous variable, say propensity to be dissatisfied with one's job, such that $q^*_{i,t} > 0$ if the i-th individual is dissatisfied ($y_{i,t} = 1$) and $q^*_{i,t} \leq 0$ if the i-th individual is instead satisfied ($y_{i,t} = 0$), c_i is the individual fixed effect, $u_{i,t}$ are the error terms identically and independently distributed with a logistic distribution with zero mean and variance $(\pi^2\sigma^2)/3$, $X_{i,t}$ are the explanatory variables and β are the corresponding coefficients. Then we cannot identify separately β and σ^2, but we can identify the parameters $\beta = \beta / \sigma$ by considering a new model where the σ^2 has been normalized to one. In other words, we consider a new model where all terms in (4) have been divided by σ so that:

$$\frac{q^*_{i,t}}{\sigma} = X_{i,t}\frac{\gamma}{\sigma} + \frac{c_i d_i}{\sigma} + \frac{u_{i,t}}{\sigma}, \tag{5}$$

which is identical to model (3) in last section

$$y^*_{i,t} = X_{i,t}\beta + \alpha_i d_i + \varepsilon_{i,t} \tag{6}$$

where $y^*_{i,t} = \frac{q^*_{i,t}}{\sigma}$, $\beta = \frac{\gamma}{\sigma}$, $\alpha_i = \frac{c_i}{\sigma}$ and $\varepsilon_{it} = \frac{u_{i,t}}{\sigma}$.

We are interested to verify the equality of the slope coefficients between two groups (countries) allowing the intercept to change between groups. For this reason we rewrite the model (4) and (6) by considering separately each element of the variables vector $X_{i,t}=[1,X_{1,(i,t)},\ldots, X_{k(i,t)}]$, that is

$$q^*_{i,t} = \gamma_0 + \sum_{j=1}^{k} X_{j,(i,t)}\gamma_j + c_i d_i + u_{i,t}, \tag{7}$$

$$y^*_{i,t} = \beta_0 + \sum_{j=1}^{k} X_{j,(i,t)}\beta_j + \alpha_i d_i + \varepsilon_{i,t} \tag{8}$$

If we compare the slope coefficients ($\beta_1,\ldots,\beta_k$)= $\tilde{\beta}$ between two countries, then they may differ because the coefficients ($\gamma_1,\ldots,\gamma_k$)= $\tilde{\gamma}$ are different between countries and/or because σ is different, i.e. the variance of the error term is different. Therefore, the usual tests for the equality of coefficients can be misleading. This problem is common to all types of models for categorical variables. Allison (1999) considers it in the case of simple probit and logit models and shows how to compute a test to verify the equality of σ across groups. In the following we extend this test to the case of fixed effects logit models.

To test the equality of the coefficients between two groups, say *A* and *B*, we can use a likelihood ratio test which compares the maximum values of the constrained likelihood, which imposes equal $\tilde{\gamma}$ but different σ between groups, and of the unconstrained likelihood, which allows instead both $\tilde{\gamma}$ and σ to vary between groups. The unconstrained fixed effects model allowing both $\tilde{\gamma}$ and σ to vary between groups is not identified. Nevertheless, we can observe the maximum value of the unconstrained likelihood because it is equal to sum of the maximum values for the likelihoods of two fixed effects logit model estimated separately for group *A* and *B*. The estimation of two separate models allows both $\tilde{\gamma}$ and σ to vary between groups even though it is not possible to identify σ and σ separately.

Following Allison (1999) the constrained fixed effects logit model is given by:

$$q^*_{i,t} = \gamma_0 + \sum_{j=1}^{k} X_{j,(i,t)}\gamma_j + \lambda d_i^g + c_i d_i + \frac{1}{1+\delta d_i^g} u_{i,t}, \qquad (9)$$

where *i* is the individual index for the pooled sample of people in group (country) *A* and *B*, d_i^g is a dummy variable taking value one if the *i-th* individual belongs to group *A* and zero otherwise, and σ allows the variance of *u* to be different for group *A* and *B* and it gives the increase rate in the error standard deviation of group B with respect to group A. By multiplying all terms in (9) by $(1+\delta d_i^g)$ we obtain

$$q_{i,t}^{*}\left(1+\delta\, d_i^{g}\right)=\gamma_0+\left(\gamma_0\delta+\lambda+\lambda\delta\right)d_i^{g}+\sum_{j=1}^{k}X_{j,(i,t)}\gamma_j + \sum_{j=1}^{k}X_{j,(i,t)}d_i^{g}\delta\gamma_j+c_i(1+\delta\, d_i^{g})d_i+u_{i,t} \quad (10)$$

where it is evident that the slope coefficients for group A and group B are equal except for a scale factor given by □.

We can avoid to estimate the fixed effects, $c_i(1+\delta\, d_i^{g})$, by considering again the joint distribution of $(y_{i,1},...,y_{i,T})$ conditional on the explanatory variables and $\sum_{t=1}^{T}y_{i,t}$,which is independent on c_i. Notice that the estimation of this conditional joint likelihood imposes a nonlinear constraint for the coefficients of the variables $X_{j,(i,t)}$ and $X_{j,(i,t)}d_i^{g}$ for *j=1,…,k*. Except for those nonlinear constraints the likelihood is identical to the standard fixed effects logit models with explanatory variables given by the dummy d_i^{g}, the variables $X_{j,(i,t)}$ and $X_{j,(i,t)}d_i^{g}$ for *j=1,…,k*.

Hoetker (2004) proposes an alternative way to compare coefficients in probit and logit models between groups which is useful when we are interested in comparing the relative effect of one explanatory variable with respect to another one between two groups. Specifically he suggests considering a Wald test to verify the equality of ratios between two coefficients say □$_j$/□$_s$ in group A and B. Comparing the ratio □$_j$/□$_s$ between groups is unaffected by change in the error variance between groups because □$_j$/□$_s$=□$_j$/ □$_s$. This test can be easily applied to the case of fixed effects logit model too. Nevertheless, the Wald test is not adequate to test nonlinear restrictions because it is not invariant to nonlinear transformations and Hoetker (2004) finds that it performs poorly in small samples. For this reason in the following we present only the likelihood ratio test results to verify the equality of coefficients of the dissatisfaction model between countries.

6.2 Test results for equality of coefficients between groups

In this section we aim to apply the likelihood ratio (LR) test to check the equality of the coefficients in the fixed effect logit models between countries and allowing the residual variance to be different between countries. In particular, our aim is to evaluate whether the effect of satisfaction with each specific job domain is the same across countries. For this reason we consider a simplified dissatisfaction model using as explanatory variables only the set of satisfaction measures with different job domains (see Table 6 for the results). The exclusion of the job related, household, personal and macro economic variables should not affect much the results because of their low level of significance.

Notice that if we aim to rank the seven different satisfaction measures with different job domains in terms of coefficient size, we do not need to take account of a different residual variance between countries. This is because the ranking of the coefficients ($\beta_1,\ldots,\beta_k$) is identical to the ranking of the coefficients ($\beta_1/\sigma,\ldots,\beta_k/\sigma$). In Table 7 we report the ranking of the satisfaction measures in terms of size for each country. The ranking does not change if we consider the ranking in terms of coefficients significance. Interestingly the satisfaction with the type of work is the most significant variable in all countries and for both definitions of job dissatisfaction, but in Italy for the national dissatisfaction definition and in Greece for both types of definitions. We find moreover that satisfaction with the type of work and earnings are always among the three most relevant variables in all countries, except in the Netherlands and only when considering the European definition of job dissatisfaction. Satisfaction with security is quite important (third position) in Ireland, Italy, Greece, Spain and Portugal. Security is instead relatively less important in the remaining countries where satisfaction with work conditions plays instead a more relevant role. Satisfaction with job commuting/distance, working times and number of working hours are the least relevant variables for all countries except in the Netherlands where satisfaction with number of working hours occupies the third position when the national job dissatisfaction definition is used. Summarizing what we learn from Table 7, we find a

quite similar relevance in the effect of different job satisfaction measure on general job dissatisfaction across countries. The only main difference is given by a major concern for security in Ireland, Italy, Greece, Spain and Portugal with respect to the other countries.

For a more precise cross-country comparison of the coefficients, we need instead to apply the LR test described in previous section. We begin by considering a fixed effect logit models for a job dissatisfaction dummy defined at European level estimated separately for each country, and we compare the coefficients for the extreme case of Greece (where the percentage of people reporting a job satisfaction below the European 10-th percentile is the highest, 38.6%) with the coefficients for each of the remaining countries. In Table 8 we report two likelihood ratio test: LR test 1 for the null hypothesis of equal coefficients but allowing for different residual variance, and LR test 2 for the null hypothesis of equal coefficients and equal residual variance.[10] In all cases the assumption of equal coefficients is strongly rejected.

Then we try to rescale the job dissatisfaction dummy by considering the national definitions and we compute again the LR tests 1 and 2 to compare coefficients for the new models between Greece and each of the other countries. Interestingly the LR tests 1 decrease (see second and penultimate column in Table 9). This implies that when considering fixed effects logit models using job dissatisfaction dummies rescaled at national level the coefficients are more similar between countries. It seems therefore that differences in level of satisfaction across countries may reflect a cultural bias. Nevertheless, the tests still reject the null hypothesis except for Ireland.

In an attempt to find another way to take account that differences in job between countries may reflect differences in the scale adopted, we estimate a new set of fixed effects logit models where the (dis)satisfaction measures with different job domains are defined in the same way as for the general job dissatisfaction. More precisely, we consider a fixed effects logit model where the dependent variable is the European job

[10] The LR test 2 is computed by comparing the log-likelihood for a fixed effects logit model estimated pooling together Greece with each specific country with which the comparison is made and the sum of the log likelihood for the fixed effects logit models estimated separately for the two countries.

dissatisfaction dummy and the explanatory variables are given by the dissatisfaction variables for the seven different job domains defined as dummies taking value one for people reporting a level of satisfaction below the European 10-th percentile of the corresponding satisfaction measure and zero otherwise.

By applying again the LR test 1 to compare the coefficients for Greece and any other countries we find that the coefficients are much more "comparable" (see Table 10). In Table 19 there is a very large decrease in the observed LR tests 1 with respect to Tables 8 and 9, and we cannot reject at 1% level of significance the equality of coefficients between Greece and Ireland, Austria and Finland. These results seem to give more evidence that people in different countries use a different scale in reporting satisfaction because of a possible cultural diversity.

In conclusion, we find that the most "comparable" job dissatisfaction models are the fixed effects logit model where the probability to observe a person reporting a job satisfaction below the European 10-th percentile is explained by the a set of dissatisfaction dummies for different job domains taking value 1 for persons reporting a level of satisfaction for each specific job domain below the corresponding European 10-th percentile.

7. Conclusion

In this paper we provide a comparison of the determinants of job dissatisfaction in ten European countries using data from the ECHP. We define people to be dissatisfied if their level of job satisfaction is below the European 10-th percentile. We explain why people are dissatisfied using a fixed effects logit model with explanatory variables given by a set of satisfaction measures with specific job domains (earnings, job security, type of work, hours of work, working timing, working conditions and environment, and distance and commuting) and other job related, household, personal and macro economic variables. Our main findings can be summarized in the three following points.

First, we find that the distribution of the job satisfaction over the six-point range, from level one to level six, differs quite substantially between countries. In particular, in Denmark, the Netherlands and Austria there are very few people, less than 10%, reporting levels of satisfaction below three, whereas in Italy and Greece 30% or more of the people report levels of satisfaction below three. Cross-cultural incomparability of self-reported satisfaction measures seems one of the reasons for differences in levels of satisfaction across countries.

Second, the satisfaction measures with different job domains are the most important variables to explain job dissatisfaction and their ranking in terms of significance does not differ much between countries. The measures of satisfaction with type of work and earnings play the most relevant role in explaining job dissatisfaction in all countries, but security seems to be more important in Ireland, Italy, Greece, Spain and Portugal than in the remaining countries.

Third, we reject very strongly the assumption that the coefficients of the satisfaction measures with different job domains are equal between countries. In an attempt to understand if this is caused by a cultural bias in answering to satisfaction questions, we rescale the job dissatisfaction dummies at national level. This rescaling does help, but not much, in reducing differences between countries. Differences in coefficients between countries reduce instead substantially when using as explanatory variables measures of dissatisfaction with different job domains defined in the same way as the general job dissatisfaction dummy. In other words, the probability of reporting a job dissatisfaction level below the European 10-th percentile is explained in a quite similar way across country by dummies for reporting satisfaction levels with different job domains below the equivalent European 10-th percentiles.

To summarize, satisfaction levels differ substantially across countries but this is at least in part caused by a cultural bias in answering to satisfaction questions. Rescaling the job dissatisfaction dummies or, even better, rescaling the satisfaction measures with different job domains helps in reducing the difference in coefficient across countries. Satisfaction with earnings plays a relevant role in explaining job

dissatisfaction in all countries even after controlling for a possible endogeneity problem. We can then conclude that earnings can buy job satisfaction.

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Figure 1. Histograms of job satisfaction by Country

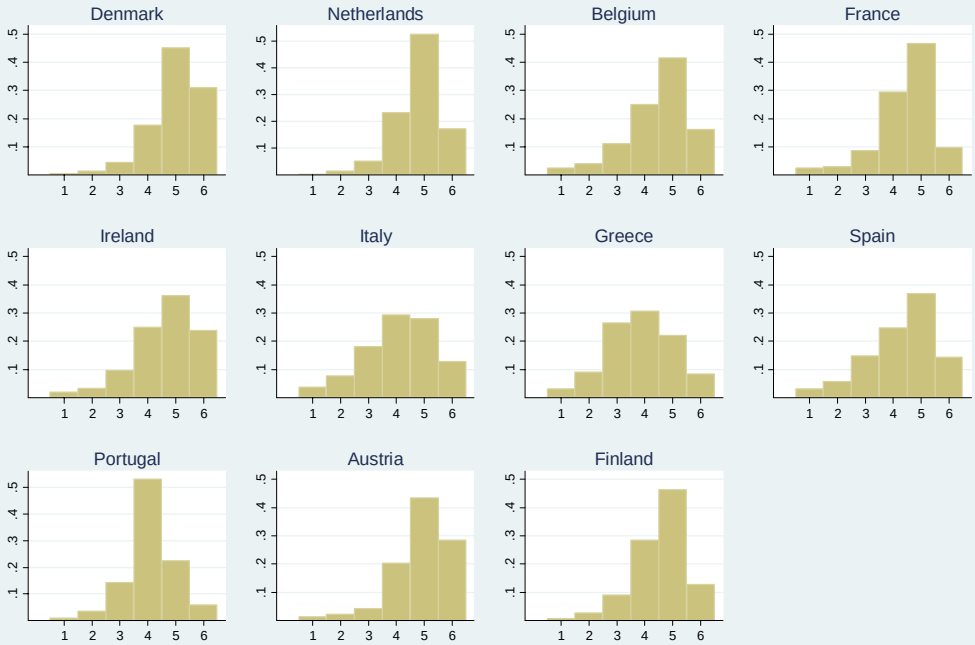

Figure 2. Histograms for house satisfaction by Country

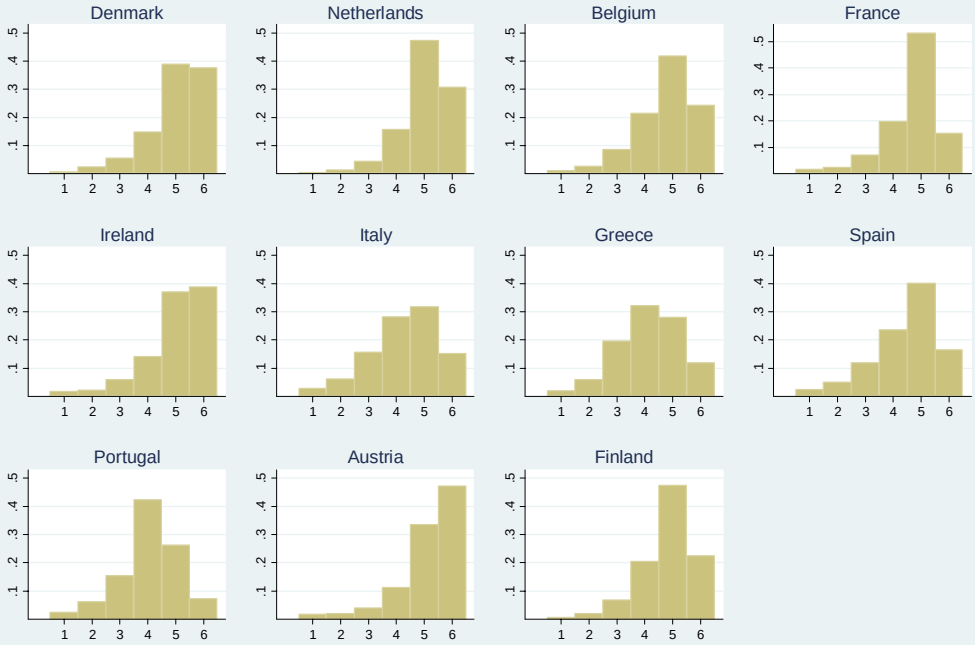

Table 1 Means and Standard Deviations of Job Satisfaction (Overall and Domains), by Country

	N. obs.	Overall	Earnings	Job security	Type work	Working hours	Working times	Working conditions	Job commuting
Denmark	7,728	4.980	4.413	4.738	4.924	4.727	4.981	4.842	4.827
		0.935	1.211	1.374	1.017	1.222	1.198	1.130	1.417
Netherlands	16,303	4.780	4.404	4.649	4.880	4.509	4.773	4.346	4.771
		0.868	1.027	1.247	0.967	1.106	1.084	1.149	1.246
Belgium	9,276	4.475	3.959	4.398	4.625	4.336	4.532	4.373	4.670
		1.152	1.234	1.375	1.139	1.246	1.293	1.245	1.393
France	18,316	4.448	3.557	4.194	4.646	3.215	4.266	4.228	4.585
		1.039	1.264	1.328	1.050	1.710	1.176	1.151	1.293
Ireland	8,289	4.610	3.842	4.572	4.889	4.421	4.787	4.791	4.956
		1.167	1.370	1.511	1.129	1.371	1.291	1.227	1.253
Italy	21,991	4.088	3.368	4.095	4.258	3.824	3.921	3.901	4.061
		1.274	1.218	1.472	1.316	1.305	1.344	1.379	1.541
Greece	13,997	3.848	3.295	3.957	3.923	3.668	3.720	3.666	4.252
		1.202	1.102	1.436	1.285	1.267	1.295	1.343	1.332
Spain	17,853	4.296	3.247	4.239	4.423	3.727	4.084	4.154	4.218
		1.236	1.288	1.480	1.242	1.439	1.415	1.368	1.464
Portugal	14,872	4.102	3.354	4.116	4.287	3.948	4.072	4.219	4.205
		0.899	1.016	0.981	0.868	0.877	0.858	0.879	1.031
Austria	7,929	4.871	4.114	4.897	5.091	4.669	4.971	4.986	4.877
		1.033	1.302	1.252	0.967	1.301	1.140	1.063	1.399
Finland	8,669	4.557	3.947	4.416	4.488	4.202	4.539	4.409	4.610
		0.964	1.203	1.326	1.030	1.299	1.313	1.102	1.392

Note: For each country we report means in the first row and standard deviations in the second row.

Table 2 Job satisfaction 10th percentiles and job dissatisfaction dummies by country

	National 10-th percentile	National job dissatisfaction dummy (mean)	European 10-th percentile	European job dissatisfaction dummy (mean)
Denmark	4	0.238	3	0.064
Netherlands	4	0.301	3	0.069
Belgium	3	0.172	3	0.172
France	3	0.138	3	0.138
Ireland	3	0.124	3	0.124
Italy	3	0.296	3	0.296
Greece	2	0.116	3	0.386
Spain	2	0. 235	3	0.235
Portugal	3	0.186	3	0.186
Austria	4	0.282	3	0.080
Finland	3	0.108	3	0.108

Note: Each national (European) job dissatisfaction dummies is equal to 1 when an individual reports a level of job satisfaction below the national (European) 10^{th} percentile.

Table 3 Means and Standard Deviations by Country

Country	Public sector	Supervisor	Part-time	Over-qualified	1 child	2 + children	Household size	Age	Health	Mood	Unemployment	Growth
Denmark	0.257	0.232	0.028	0.357	0.247	0.371	3.355	39.995	1.550	0.000	5.818	2.577
							(1.107)	(8.111)	(0.711)	(0.421)	(1.269)	(0.785)
Netherlands	0.220	0.199	0.072	0.609	0.198	0.405	3.468	40.453	1.921	0.000	4.692	3.191
							(1.157)	(7.639)	(0.635)	(0.383)	(1.762)	(0.888)
Belgium	0.291	0.180	0.038	0.336	0.259	0.398	3.606	39.836	1.851	0.000	8.917	2.644
							(1.137)	(7.541)	(0.678)	(0.385)	(1.122)	(1.174)
France	0.278	0.196	0.052	0.469	0.276	0.388	3.602	40.255	2.155	0.000	11.037	2.623
							(1.173)	(8.097)	(0.748)	(0.379)	(1.132)	(0.900)
Ireland	0.277	0.221	0.066	0.480	0.223	0.558	4.405	41.334	1.552	0.000	9.991	9.262
							(1.534)	(7.647)	(0.679)	(0.417)	(3.676)	(1.968)
Italy	0.272	0.127	0.054	0.514	0.359	0.303	3.662	41.097	2.137	0.000	11.337	1.938
							(1.100)	(7.582)	(0.736)	(0.455)	(0.760)	(0.845)
Greece	0.252	0.099	0.068	0.480	0.283	0.419	3.917	41.474	1.403	0.000	10.022	3.380
							(1.139)	(7.690)	(0.661)	(0.388)	(0.927)	(0.920)
Spain	0.185	0.122	0.034	0.467	0.322	0.342	3.827	40.217	2.011	0.000	19.495	4.021
							(1.216)	(7.765)	(0.677)	(0.461)	(3.838)	(0.918)
Portugal	0.192	0.074	0.021	0.541	0.371	0.317	3.916	40.123	2.337	0.000	5.810	4.203
							(1.339)	(8.128)	(0.660)	(0.372)	(1.357)	(2.411)
Austria	0.252	0.161	0.023	0.398	0.266	0.378	3.958	40.334	1.803	0.000	4.082	2.559
							(1.417)	(7.758)	(0.755)	(0.440)	(0.390)	(0.909)
Finland	0.230	0.247	0.046	0.322	0.244	0.397	3.577	41.108	2.066	0.000	11.712	4.499
							(1.252)	(8.016)	(0.722)	(0.391)	(1.852)	(1.193)

Note: For each country we report means in the first row and standard deviations in the second row.

Table 4 Job dissatisfaction fixed effects logit model by country and with full set of explanatory variables

Country	Definition Dissatisfaction	Satisfaction measures with different job domains						
		Earnings	Security	Type	Hours	Times	Conditions	Commuting
Denmark	European	-0.441	-0.216	-0.860	-0.118	-0.017	-0.291	0.093
		(0.000)	(0.004)	(0.000)	(0.226)	(0.857)	(0.001)	(0.272)
	National	*-0.427*	*-0.144*	*-0.924*	*-0.245*	*-0.175*	*-0.284*	*-0.118*
		(0.000)	*(0.008)*	*(0.000)*	*(0.000)*	*(0.006)*	*(0.000)*	*(0.022)*
Netherlands	European	-0.218	-0.163	-0.732	-0.226	-0.170	-0.433	-0.038
		(0.001)	(0.001)	(0.000)	(0.000)	(0.007)	(0.000)	(0.483)
	National	*-0.250*	*-0.127*	*-0.603*	*-0.224*	*-0.226*	*-0.319*	*-0.130*
		0.000	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Belgium	European	-0.533	-0.151	-0.854	-0.080	0.044	-0.387	-0.183
		(0.000)	(0.040)	(0.000)	(0.380)	(0.590)	(0.000)	(0.024)
France	European	-0.579	-0.289	-0.875	0.051	-0.155	-0.296	-0.192
		(0.000)	(0.015)	(0.000)	(0.659)	(0.193)	(0.018)	(0.133)
Ireland	European	-0.317	-0.352	-0.601	-0.122	-0.016	-0.011	-0.071
		(0.000)	(0.000)	(0.000)	(0.129)	(0.836)	(0.884)	(0.339)
Italy	European	-0.594	-0.292	-0.717	-0.190	-0.092	-0.204	-0.085
		(0.000)	(0.000)	(0.000)	(0.000)	(0.037)	(0.000)	(0.022)
	National	*-0.733*	*-0.231*	*-0.603*	*-0.110*	*-0.129*	*-0.242*	*0.091*
		0.000	*(0.000)*	*(0.000)*	*(0.095)*	*(0.030)*	*(0.000)*	*(0.081)*
Greece	European	-0.801	-0.588	-0.530	-0.377	-0.014	-0.169	-0.060
		(0.000)	(0.000)	(0.000)	(0.000)	(0.840)	(0.007)	(0.253)
	National	*-1.463*	*-0.519*	*-0.372*	*-0.137*	*0.191*	*-0.318*	*-0.084*
		0.000	*(0.000)*	*(0.003)*	*(0.274)*	*(0.102)*	*(0.003)*	*(0.314)*
Spain	European	-0.532	-0.286	-0.802	-0.255	-0.133	-0.159	-0.075
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.025)
Portugal	European	-0.371	-0.483	-0.925	-0.224	-0.205	-0.202	0.030
		(0.000)	(0.000)	(0.000)	(0.027)	(0.036)	(0.020)	(0.670)
Austria	European	-0.493	-0.290	-0.677	0.209	-0.440	-0.460	0.000
		(0.000)	(0.001)	(0.000)	(0.057)	(0.000)	(0.000)	(0.997)
	National	*-0.343*	*-0.206*	*-0.761*	*-0.034*	*-0.214*	*-0.386*	*-0.121*
		0.000	*(0.000)*	*(0.000)*	*(0.610)*	*(0.001)*	*(0.000)*	*(0.034)*
Finland	European	-0.532	-0.369	-0.934	-0.079	-0.110	-0.455	-0.105
		(0.000)	(0.000)	(0.000)	(0.395)	(0.242)	(0.000)	(0.180)

Note: We report the estimated coefficients and standard errors between parentheses. For countries where national and European job dissatisfaction dummies do not differ, we report only the estimation results for the European job dissatisfaction dummy.

Table 5 Job dissatisfaction fixed effects logit model by country and with full set of explanatory variables: specification tests

	Dissatisfaction Defintition	No. Obs.	LR test Joint significance	Wald test significance			
				Satisfaction measures	Job related variables	Household/personal variables	Unemployment and growth rates
Denmark	European	1244	310.187	157.453	2.514	8.061	0.139
			0.000	0.000	0.642	0.327	0.933
	National	*2820*	*648.548*	*344.923*	*9.053*	*25.293*	*1.908*
			0.000	*0.000*	*0.060*	*0.001*	*0.385*
Netherlands	European	2967	597.165	336.389	3.619	13.72	0.331
			0.000	0.000	0.460	0.056	0.848
	National	*7622*	*1046.973*	*710.655*	*1.781*	*23.696*	*7.454*
			0.000	*0.000*	*0.776*	*0.001*	*0.024*
Belgium	European	1395	358.744	170.593	5.274	11.55	11.503
			0.000	0.000	0.260	0.116	0.003
France	European	636	169.107	73.478	0.496	5.247	1.39
			0.000	0.000	0.974	0.63	0.499
Ireland	European	1105	187.871	106.341	7.813	4.933	1.793
			0.000	0.000	0.099	0.668	0.408
Italy	European	6088	1629.507	826.682	11.666	8.22	3.532
			0.000	0.000	0.02	0.314	0.171
	National	*3149*	*796.684*	*398.843*	*4.114*	*4.087*	*0.850*
			0.000	*0.000*	*0.391*	*0.770*	*0.654*
Greece	European	3320	1051.119	488.928	12.828	9.253	1.173
			0.000	0.000	0.012	0.235	0.556
	National	*1449*	*497.962*	*189.125*	*8.489*	*6.379*	*0.965*
			0.000	*0.000*	*0.075*	*0.496*	*0.617*
Spain	European	5963	1751.887	862.447	2.387	18.516	3.392
			0.000	0.000	0.665	0.010	0.183
Portugal	European	3066	614.38	308.823	2.723	16.027	10.638
			0.000	0.000	0.605	0.025	0.005
Austria	European	1064	305.106	144.364	9.011	14.147	0.417
			0.000	0.000	0.061	0.049	0.812
	National	*2895*	*583.182*	*327.821*	*6.800*	*18.480*	*9.475*
			0.000	*0.000*	*0.147*	*0.010*	*0.009*
Finland	European	1468	422.261	197.626	3.858	6.443	0.498
			0.000	0.000	0.426	0.489	0.780

Note: For each country and each dissatisfaction dummy definition we report the tests in the first row and the p-values in the second row.

Table 6 Job dissatisfaction fixed effects logit model by country and with only satisfaction measures as explanatory variables

Country	Definition Dissatisfaction	No. obs.	LR test	Satisfaction measures with different job domains						
				Earnings	Security	Type	Hours	Times	Conditions	Commuting
Denmark	European	1840	459.939	-0.417	-0.145	-0.864	-0.204	-0.071	-0.335	0.038
				0.000	0.013	0.000	0.005	0.317	0.000	0.570
	National	4087	880.54	-0.364	-0.171	-0.922	-0.212	-0.157	-0.302	-0.123
				0.000	0.000	0.000	0.000	0.001	0.000	0.003
Netherlands	European	3363	611.773	-0.168	-0.158	-0.696	-0.247	-0.184	-0.389	-0.040
				0.004	0.001	0.000	0.000	0.001	0.000	0.418
	National	8536	1090.58	-0.230	-0.113	-0.595	-0.230	-0.220	-0.309	-0.134
				0.000	0.000	0.000	0.000	0.000	0.000	0.000
Belgium	European	3695	621.069	-0.444	-0.102	-0.606	-0.155	0.085	-0.368	-0.077
				0.000	0.019	0.000	0.003	0.090	0.000	0.091
France	European	6348	1366.486	-0.488	-0.277	-0.575	-0.008	-0.307	-0.451	-0.079
				0.000	0.000	0.000	0.736	0.000	0.000	0.038
Ireland	European	2264	338.064	-0.401	-0.230	-0.515	-0.125	-0.006	-0.085	-0.054
				0.000	0.000	0.000	0.019	0.911	0.110	0.298
Italy	European	11824	3126.149	-0.643	-0.224	-0.742	-0.172	-0.028	-0.150	-0.102
				0.000	0.000	0.000	0.000	0.366	0.000	0.000
	National	6513	1677.839	-0.762	-0.225	-0.609	-0.138	-0.116	-0.180	0.038
				0.000	0.000	0.000	0.001	0.006	0.000	0.267
Greece	European	8991	2916.083	-0.805	-0.469	-0.706	-0.156	-0.081	-0.147	-0.190
				0.000	0.000	0.000	0.000	0.043	0.000	0.000
	National	4881	1521.935	-1.203	-0.367	-0.557	-0.160	-0.015	-0.153	-0.071
				0.000	0.000	0.000	0.007	0.791	0.003	0.084
Spain	European	9888	2534.226	-0.484	-0.261	-0.741	-0.199	-0.121	-0.127	-0.080
				0.000	0.000	0.000	0.000	0.000	0.000	0.002
Portugal	European	6352	1225.745	-0.549	-0.484	-0.886	-0.188	-0.216	-0.189	0.002
				0.000	0.000	0.000	0.004	0.001	0.001	0.961

Austria	European	1691	405.456	-0.558	-0.314	-0.625	0.186	-0.295	-0.352	-0.040
		4282	751.106	0.000	0.000	0.000	0.016	0.000	0.000	0.588
	National			-0.355	-0.189	-0.761	-0.011	-0.147	-0.392	-0.097
				0.000	0.000	0.000	0.828	0.004	0.000	0.041
Finland	European	2086	520.085	-0.586	-0.229	-0.859	-0.028	-0.114	-0.409	-0.006
				0.000	0.000	0.000	0.696	0.106	0.000	0.918

Note: We report the coefficients (1st row) and standard errors (2nd row)fro each country and job dissatisfaction definition. For countries where national and European job dissatisfaction dummies do not differ, we report only the estimation results for the European job dissatisfaction dummy.

Table 7 Ranking of the relevance of different job domains in explaining general job dissatisfaction

Country	Dissatisfaction definition	1st	2nd	3rd	4th	5th	6th	7th
Denmark	European	Type	Earnings	Conditions	Hours	Security	Times	Commuting
	National	*Type*	*Earnings*	*Conditions*	*Hours*	*Security*	*Times*	*Commuting*
Netherlands	European	Type	Conditions	Hours	Times	Earnings	Security	Commuting
	National	*Type*	*Conditions*	*Earnings*	*Hours*	*Times*	*Commuting*	*Security*
Belgium	European	Type	Earnings	Conditions	Hours	Security	Commuting	Times
	National				*No change*			
France	European	Type	Earnings	Conditions	Times	Security	Commuting	Hours
	National				*No change*			
Ireland	European	Type	Earnings	Security	Hours	Conditions	Commuting	Times
	National				*No change*			
Italy	European	Type	Earnings	Security	Hours	Conditions	Commuting	Times
	National	Earnings	Type	Security	Conditions	Hours	Times	Commuting
Greece	European	Earnings	Type	Security	Commuting	Hours	Conditions	Times
	National	Earnings	Type	Security	Hours	Conditions	Commuting	Times
Spain	European	Type	Earnings	Security	Hours	Conditions	Times	Commuting
	National				*No change*			
Portugal	European	Type	Earnings	Security	Times	Conditions	Hours	Commuting
	National				*No change*			
Austria	European	Type	Earnings	Conditions	Security	Times	Commuting	Hours
	National	Type	Conditions	Earnings	Security	Times	Commuting	Hours
Finalnd	European	Type	Earnings	Conditions	Security	Times	Hours	Commuting
	National				*No change*			

Note: We rank the satisfaction measure with different job domains (type of work, earnings, conditions, hours, times and commuting) by descending order of their coefficients in absolute value. if we consider the t-statistics, the rank does not in general change.

Table 8 Likelihood ratio tests for equality coefficients and residual variance between Greece and all other countries in a model for European job dissatisfaction

Country	H_0: Equal coefficients but different variance		H_0:Equal coefficients and equal variance		Δ Mean job dissatisfaction
	LR test 1	p-value	LR test 2	p-value	dummy
Denmark	166.717	0.000	173.455	0.000	0.320
Netherlands	227.409	0.000	258.207	0.000	0.317
Belgium	83.445	0.000	125.818	0.000	0.214
France	143.209	0.000	152.723	0.000	0.248
Ireland	25.158	0.000	105.783	0.000	0.262
Italy	30.420	0.000	48.701	0.000	0.090
Spain	122.588	0.000	135.413	0.000	0.151
Portugal	101.989	0.000	101.991	0.000	0.200
Austria	142.870	0.000	171.336	0.000	0.306
Finland	57.124	0.000	65.548	0.000	0.278

Dependent variable: European job dissatisfaction dummy

Explanatory variables: Job dissatisfaction ordinal measures with different job domains

Note: In last column we report the difference between the mean of the European job dissatisfaction dummy for Greece and each other country.

Table 9 Likelihood ratio tests for equality coefficients and residual variance between Greece and all other countries in a model for national job dissatisfaction

Country	H_0: Equal coefficients but different variance		H_0:Equal coefficients and equal variance		Δ Mean job dissatisfaction	Δ LR test 1	ΔΔ Mean job dissatisfaction
	LR test 1	p-value	LR test 2	p-value	dummy		dummy
Denmark	51.429	0.000	61.711	0.000	0.117	115.2883	0.203
Netherlands	113.768	0.000	143.225	0.000	0.180	113.6401	0.137
Belgium	55.273	0.000	107.123	0.000	0.051	28.172	0.163
France	102.170	0.000	116.928	0.000	0.017	41.03906	0.231
Ireland	5.639	0.465	84.202	0.000	0.003	19.51864	0.259
Italy	33.079	0.000	59.418	0.000	0.005	-2.65918	0.085
Spain	53.175	0.000	84.844	0.000	0.114	69.41288	0.037
Portugal	38.923	0.000	38.924	0.000	0.065	63.06666	0.135
Austria	30.796	0.000	43.928	0.000	0.171	112.0736	0.135
Finland	35.602	0.000	40.945	0.000	0.013	21.52214	0.265

Dependent variable: National job dissatisfaction dummy

Explanatory variables: Job dissatisfaction ordinal measures with different job domains

Note: In last three columns we report (i) the difference between the mean of the national job dissatisfaction dummy for Greece and each other country, (ii) the difference between LR test 1 for models using the European dissatisfaction definition (Table 7) and models using the National dissatisfaction definition (Table 8), (iii) the difference between again Table 7 and Table 8 in the difference between mean dissatisfaction dummies.

Table 10 Likelihood ratio tests for equality coefficients and residual variance between Greece and all other countries in a model for European job dissatisfaction explained with European dissatisfaction dummies

Country	H_0: Equal coefficients but different variance		H_0:Equal coefficients and equal variance		Δ Mean job dissatisfaction
	LR test 1	p-value	LR test 2	p-value	dummy
Denmark	28.126	0.000	38.501	0.000	0.320
Netherlands	49.120	0.000	50.196	0.000	0.317
Belgium	22.600	0.001	25.498	0.000	0.214
France	53.312	0.000	53.321	0.000	0.248
Ireland	13.443	0.037	13.457	0.036	0.262
Italy	24.953	0.000	29.104	0.000	0.090
Spain	24.848	0.000	24.971	0.000	0.151
Portugal	23.329	0.001	24.527	0.000	0.200
Austria	15.770	0.015	18.878	0.004	0.306
Finland	7.046	0.317	9.124	0.167	0.278

Dependent variable: European job dissatisfaction dummy

Explanatory variables: Job dissatisfaction with different job domains defined as dummies at European level

Note: In last column we report the difference between the mean of the European job dissatisfaction dummy for Greece and each other country.