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Specialization in Urban, Port and Transport Economics

Difference in happiness levels between urban and rural areas of EU

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Abstract

Deciding where to live is all but a trivial choice for the majority of people. Should they opt for an urban location, select a less populated rural place, or go for a middle option combining urban and rural characteristics? The decision among others will affect experienced happiness of individuals with their life making the decision a serious trilemma. In this thesis the author deals with the topic of location (urban vs. intermediate vs. rural) and its effect upon subjective well-being. After reviewing the literature, and exposing the pros and cons of living in urban and rural areas, the author uses available data from the EU Eurobarometer survey for seven European countries and a period spanning from 1973 to 2015 to examine the connection between place of residence (i.e., degree of urbanization) and happiness in the form of subjective well-being. The results show a large prim for subjective well-being coming from urban dwelling and a smaller surge coming from living in intermediate (between rural and urban) location.

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Introduction

Urbanization is all but a recent phenomenon, with researchers tracing urbanization processes to more than 3500 years ago (Reba, Reitsma and Seto, 2016; Chandler, 1987; Modelski, 2003). Nevertheless, the largest waves of urbanization took place during the previous (Annez and Buckley, 2009) and current century (Cohen, 2006). Scientists occupied with studying dwelling, focused among others in the study of life in urban locations. For example, the early project of "Ekistics", by the Greek architect Constantinos Doxiadis during the fourties was an effort for comprehensive study of human settlements (Papaioannou, 2005).

One particular aspect of urban life that seem to have puzzled scientists, especially after the advent of happiness studies (Frey, 2008; Kahneman and Krueger, 2006; Dolan, Peasgood and White, 2008; Stevenson and Wolfers, 2008; Heybron, 2003) relates to the connection between location and happiness (Steptoe, Deaton and Stone, 2015; see Wang and Wang, 2016 for a review). Indeed, the importance of place for happiness is identified already in the first volume of the "Journal of Happiness Studies". There, Veenhoven (2000) discusses the term quality of life based on earlier distinctions by Zapf (1984) and Lane (1994) mentioning the relevancy of environment -natural or artificial- on the potential for the individual for increased well-being (see also Palisi and Ransford, 1987). Several researchers have used numerous datasets, in an effort to understand whether urban or rural populations experience higher levels of happiness (Ballas and Dorling, 2013; Ballas, 2013; see Marans and Stimson, 2011; Krefis et al., 2018 for a review). For example, predominant social theorists such as Thoreau or Wirth expressed a negative viewpoint in regards to the life in cities (White and White, 1977; Wirth, 1938). Those views echoed earlier European theories such as those developed by the eminent German social scientist and philosopher Ferdinand Tönnies ([1887] 2002) and have found strong support in data (e.g., Winters and Li, 2017; Mouratidis, 2017; see also Morris, 2019 for comparisons between cities and suburbans). On the other hand, a portion of scientists has propagated an unconditional support for the advantage of city dwellers when it comes to happiness. Representative of this group is Glaeser (2011) who supports that living in a modern city is the optimal decision in terms of happiness. Finally a third group supports a non-causal relation (e.g., Bergstad et al., 2012; Florida, 2008). This diversity is reflected on recent reviews for the non-conclusiveness of evidence (Sørensen, 2014; Morrison and Weckroth, 2018; Okulicz-Kozaryn and Mazelis, 2018).

In the context of this thesis, we revisit the debate using data for urban and rural populations and densities (Kim, 2008) from the Eurobarometer surveys for seven countries and a period spanning from 1970 to 2015. Given the inexplicable nature of happiness, in the context of this thesis and given the availability of data we use the Subjective Well-Being (SWB) perspective that measures happiness as an individual's evaluation of her life for a long course of time (see Smith and Reid, 2018 for a discussion). In the next chapter, we will present some theoretical facts about the advantages and disadvantages of city (urban) and countryside (rural) life. We do so to determine -potential- items that the urban dwelling outweighs rural living and vice versa. Although, our analysis is using subjective evaluations of happiness, our review will report studies with both objective and subjectively measures of well-being (Ballas, 2013). Subsequently, using data from EU citizens, we will examine the direction and magnitude of the relation between location and SWB in European countries. Finally, in the last part of the thesis, we will discuss the shortcomings of our studies and provide some remedies for further research.

Literature Review

Primary figures in the theorizing of happiness and dwelling were American sociologists. Scientists, such as Wirth (1938) or Park (1915), equated the field of sociology with the study of human state in the boundaries of the city. This sociological viewpoint on effects of cities upon humans flourished until the 1970s and the major publications of the eminent sociologist Claude Fischer (e.g., Fischer, 1972; 1973; 1975). At that era, we also see the first inclusive study that used objective measures to study well-being as a function of geography (Smith, 1973; see Goodrich, Allin, and Hayes 1935; Thorndike, 1939 for earlier efforts). The latter approach is actually imposing economic principles through utility functions substituting measures of happiness with indicators of high quality life (e.g., air quality, Shapiro, 2006; rent prices, Rosen, 1974; crime, Glaeser and Sacerdote, 1999; entertainment amenities such as bars, Glaeser, Kolko and Saiz, 2001; migration data, Faggian, Olfert and Partridge, 2011). Recently, those models have received some critique in regards to their equilibrium processes through migration dynamics (Carlsen and Leknes, 2019).

The second approach to the study of happiness and dwelling location treats happiness from a more subjective perspective (psychological and sociological). This perspective developed after the quality of life perspective and after the first sociological theories of happiness in cities. It was initially concerned to examine whether objective measure of life quality, corresponds to more subjective measures of happiness coming from survey questions (Schneider, 1975; for a review see Bleys, 2012; Joshanloo, Jovanović and Taylor 2019; Gasper, 2005). Currently and following the rise of happiness studies as well as concerns regarding the reliability of objective factors for measuring well-being (David, Boniwell and Conley Ayers, 2013), subjective approaches are gaining importance. Factors considered in those models are material well-being, productivity, health, intimacy, safety, community and emotional well-being (Cummins, McCabe, Rome and Gullone, 1994). More recently, Layard (2011) added personal freedom and personal values (e.g., religion). Further down, we will borrow findings from both research traditions to discuss factors that potentially affect in a different way, well-being in urban and rural areas. We concentrate our discussion around labor, consumption, social interactions and environment.

Labor and Economics

Specialization, technological innovation and creativity are made available by the dense networks of people and the lower transportation costs in cities (Glaeser et al., 2001; Florida, 2008; Glaeser, 2011; Steines and Fisher, 1974). These conditions provide easier transportation and a "productivity premium" accompanied by higher wages (Glaeser and Mare, 2001) and therefore enhanced happiness levels (Stutzer and Frey, 2008; Easterlin, 1974; Inglehart, 1990; Hall, 2000; De Haan, 2000). Yet, current developments in infrastructure and technology have made possible an "infiltration" between urban and rural life (Requena, 2016) with rural citizens working in urban places and thus enjoying the aforementioned advantages. A further consideration when it comes to income refers to inequalities of income distribution between urban and rural areas. Equality, or positive social comparisons (i.e., comparisons in favor of the individual) in distributions is a relevant and well-studied prerequisite for happiness (Higgins, Campanera and Nobajas, 2011; Luttmer, 2005; Ballas, Dorling, and Shaw, 2007; Wang, Schwanen and Mao, 2019) as well as functioning of public institutions and health (Kaplan, Pamuk, Lynch, Cohen and Balfur, 1996). Although, urbanization has restricted inequalities in the global level (Bok, 2010), inequalities within cities (versus more rural areas) does decrease well-being (Berry and Glaeser, 2005; Graham and Felton, 2006).

Consumption and Services

One of the primary factors affecting positively the relation between urbanization and happiness is related to the consumer ideal of happiness. In a highly cited paper, Glaeser, Kolko and Saiz show that nowadays cities outperform rural areas to the benefits (amenities) on consumption offered to consumers (Glaeser, Kolko and Saiz, 2001; see also Robinson, Murray-Rust, Rieser, Milicic and Rounsevell, 2012). The first and foremost amenity is the accessibility to goods and services offered to city dwellers in combination with the availability of good public services (e.g., schooling, policing, leisure and hospitalization). These amenities give a significant boost to consumers' welfare (Case and Shiller, 2003; Frey and Stutzer 2002; Knight, Shi and Song, 2006; Pfeiffer and Cloutier, 2016; Leyden, Goldberg and Michelbach, 2011; see Morris, 2019 for more nuanced findings). Research by Carruthers and Mulligan (2012) underlined the higher importance of human to natural amenities on housing values. Nonetheless, as recent research has exposed abundance of choices is not the key to happiness for city dwellers (Okulicz-Kozaryn and Mazelis, 2018). Materialism is open to adaptation (Easterlin, 2003), choice overload (Schwartz, 2004), but also increased social comparison (Carter and Gilovich, 2010;

Howell and Hill 2009) that is detrimental to happiness (Ballas, Dorling, and Shaw, 2007). Furthermore, researchers such as Korpi, Clark and Malmberg (2010) underlie that higher disposable income and consumption choices offered in urban areas do come with a prize of higher housing expenditures.

Social Interactions

Social interactions and social cohesion are of primary importance when it comes to happiness considerations (Ballas and Dorling, 2007; Diener and Seligman, 2002; Powdthavee, 2007) and cities seem to curtail social lives, by for example, increasing loneliness (Scharf and De Jong Gierveld, 2008). Although, technological developments of the recent past have provided citizens with high speed of communication, increasing the potential of social contacts (Costa and Kahn, 2000), social scientists have pointed towards social problems of city life. Early sociologist Louis Wirth theorized the "malaise" of urban life, by pointing out that cities increase alienation of people, deviant behavior and normlessness (Wirth, 1938). This perspective is echoed in the more recent "economics of localization" perspective (Norberg-Hodge, Gorelick and Page, 2011). Alienation of people is a natural consequence of the hectic paces and the plethora of social interactions between heterogeneous people in dense places (Simmel, 1903). For city-dwellers, isolation and alienation become a conscious strategy for supporting privacy and protecting the self from the psychological overload of the numerous interpersonal interactions (Lederbogen et al., 2011; Sørensen, 2014). Simultaneously, deprivation of meaningful interactions imposes negative effects on people's happiness (Wirth, 1938) and marriages (Sander, 1985). Nonetheles, life in less urban places does also pose threats to socialization. In a meticulous review, Philip and Shucksmith (2003) theorize the multiple facets of social (and economic) exclusion and apply their framework in rural Britain. They show, for instance, the difficulty in developing a social network if you are an outsider to the community, underlying simultaneously network prominence for rural living.

Apart from unconscious or conscious isolationist efforts, Wirth (1938) pointed towards cities as spaces cultivating deviance and law breaking. For instance, Glaeser and Sacerdote (1999) reported higher crime rates from people living in the city (see also Bettencourt et al., 2010). As Smelser and Alexander (1999), and previously Fischer, Merton and Merton (1976) explicated, living in the diverse environment of the city increase crime rates by decreasing the ability to realize common goods and maintain effective control (Sampson, Raudenbush and Earls, 1997; Kawachi, Kennedy and Wilkinson, 1997), negatively influencing psychological and physical

health of victims and society (Zimmerman and Bell, 2006). The effects are magnified, when we consider the physical environment and living space deprivation, as well as the segregation that put an extra burden to people's behavior (Massey and Denton, 1993). On the other hand, heterogeneity of city dwellers is not an issue for rural areas where homogeneity (e.g., through similar idioms and value ideals) is predominant. Although, cohesion and homogeneity might seem important for social interactions and common values, it might hinder personal freedom as the latter was identified as a crucial factor for subjective well-being by Layard (2011 [2005]) (see also the Inglehart—Welzel cultural dimensions 2014).

Environment (natural and artificial)

The role of environment and climate are important considerations when it comes to happiness (Wells and Donofrio, 2011; Sandifer, Sutton-Grier and Ward, 2015; Frumkin et al., 2017; see Krefis et al. 2018 for a review). In an increasing fashion, numerous researchers argue for the positive relation between greenness, environment quality, air pollution, biodiversity and health (James et al., 2015; Markevych et al., 2017; Krefis et al. 2018; Fong et al., 2018; Gascon et al., 2015; Dzhambov, Dimitrova and Dimitrakova, 2014; Dadvand et al., 2016; MacKerron and Mourato 2009; MacKerron and Mourato 2013; Cuñado and De Gracia, 2013). Other researchers have also conducted studies in the intersection between environmental quality, health and SWB (Dolan et al. 2008; Frey and Stutzer, 2002; Shapiro, 2006; Berry and Okulicz-Kozaryn, 2011; see Bratman et al. 2019 for a recent review)[1]. Lately, Mavoa and her colleagues showed how environment can be further delineated in public and private green spaces, underlying latter's essential role in well-being for people in cities (Mavoa, Davern, Breed and Hahs, 2019). Apart from physical environment, research has examined the effect of artificial environment upon on SWB. For instance, Whisler, Waldorf, Mulligan, and Plane (2008) reported evidence that older people are attracted from milder climate, while youngsters find cultural and recreational amenities more important (see also Okulicz-Kozaryn and Valente, 2019). Similarly, Feng, Tang and Chuai (2018), evidenced a positive relation between urbanism and housing facilities, which are highly important for elder people. On the other hand, urban life is also associated with traffic congestion (Broersma and Van Dijk, 2008) and likelihood to be exposed to diseases (Alirol et al., 2011; Kuddus, Tynan and McBryde, 2020). In a comprehensive model Robinson et al. (2012) developed an agent-based model to simulate the impact on well-being of the availability of productive agricultural soil, noise pollution, "access to green space", public transport and

[1] For findings in regards to the bidirectional effects of SWB on health, please refer to Diener, E., Pressman, S.D., Hunter, J., Delgadillo-Chase, D., 2017.

"access to shops" in Slovenia. They show the importance of the particularities of different areas (e.g., previous level of urbanization, distance between city center and rural places) in driving the final effect of urbanization (see also Howley, Scott and Redmond 2009 for a study of neighborhoods).

In the previous paragraphs, we presented literature findings over the advantages and disadvantages of living in urban and rural areas. We further tap upon different methodologies employed in those studies. The review showed that research is not conclusive over a universal advantage of urban or rural life for SWB. In the next section of the thesis, we discuss our dataset and test whether urban (vs. intermediate vs. rural) citizens of seven countries of EU experience higher or lower SWB. The nature of our dataset cannot handle completely the topics discussed in the literature review, but can instead provide a panoptic view over SWB of different populated and of different density places. Yet, in our last model, which suffer from multicollinearity, we try through interactions to study particular hypotheses presented in this review.

Methodology & Results

Data Analysis – Main Variables

The dependent variable of this study is the self-reported individual life satisfaction (SWB) based on the Eurobarometer survey for the years 1973-2015 for seven European countries (Belgium, Denmark, UK, France, Germany, the Netherlands) and approximately half million respondents[2]. Subjective well-being is measured with answers 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?". Potential answers were 1-Not at all satisfied, 2-Not satisfied, 3-Fairly Satisfied, 4-Very satisfied. The use of SWB as indicator of happiness is not only praised for its reliability and validity (Kahneman and Krueger, 2006), but also its parsimony to capture the phenomenon of interest (Cheung and Lucas, 2014). The particular indicator has been previously used in research (e.g., Arampatzi, Burger and Veenhoven, 2015; Arampatzi, Burger, Stavropoulos and van Oort, 2019).

The focal predictor of SWB is the place of residence of the respondent (whether Urban, Intermediate or Rural). European Union districts (i.e., territorial units at level three (Nomenclature of Territorial Units for Statistics 3 or simply NUTS 3)) can either belong to one of three categories spanning from predominantly rural, to intermediate and to predominantly urban. These three categories belong to the EU Urban-Typology, which is based upon OECD directions. Two criteria are employed for characterizing a region; its population density and its minimum size of residents. Predominantly rural areas are NUTS level 3 regions where at least 50% of the population live in rural grid cells[3]. Then, intermediate regions have between 50 and 80% of their population in urban clusters, while urban regions have more than 80% of their population in urban clusters[4] (Eurostat, Archive, Urban-Rural Typology). Eurostat provides each NUTS 3 region with a variable indicating whether it is rural, intermediate or urban. Nonetheless, the provided dataset for the study had information over the residence of people up to the second level of aggregation (NUTS 2), which is the level of the county or the first level (NUTS 1), which is the level of state or region. Hence, we aggregated information from NUTS 3 to NUTS 2 and NUTS 1 following the subsequent method.

[2] The initial dataset included responses from Ireland and Luxemburg as well. They were excluded because they did not present any variation in the field of urbanization. We discuss this further.
[3] Rural grid cells are those not identified as urban centres or as urban clusters.
[4] Urban cluster is a cluster of contiguous grid cells of 1 km² (including diagonals) with a population density of at least 300 inhabitants per km² and a minimum population of 5 000 inhabitants.

We identified via European Union sources available from Eurostat (Eurostat, Rural Development Methodology) the constituting district per county and the constituting counties per region. Then, each county was labeled as urban, rural or intermediate based on the average of its districts[5] (see Appendix for all data clearing processes). For cases of counties, where the districts were equally shared across two or three categories and were no more available observations we used as label the higher level (for example between intermediate and urban, we used urban). However, in cases that the county had districts equally distributed in two categories and some fewer districts in other category, we used from the former two labels, the one closest to the latter. For instance, for a county with four districts (3 classified as Urban and 1 classified as Intermediate), the county was classified as urban. For a county with four districts (2 classified as Urban and 2 classified as Intermediate), the county was classified as urban. For a county with five districts (2 classified as Urban and 2 classified as Intermediate and 1 classified as Rural), the county was classified as intermediate. We followed the same process to move for some cases that we had data over NUTS 1 (occurred numerous times for UK respondents). We further deleted columns news and news2 according to supervisor advisor of their irrelevancy.

In the case of Ireland, the data were partially problematic, since according to the information found on internet for the sole 3 NUTS 2 counties (IE04, IE05, IE06), none of these could be identified. This might be due to outdated categories used in the report. However, according to Eurostat most recent reports, Ireland is totally rural except for Dublin, which has the IE061 or previously the IE021 code. The latter could not be found in our data, so we classified all responses as belonging to rural residents. Subsequently, we did not include those observations in our analysis, since they do not present any variability in regards to the variable of interest. For Luxemburg, we do not have either Urban or Rural as well. For these reasons, we decided to exclude Ireland and Luxemburg from our analysis. Moreover, for some cases there was a NUTS 2 level category that was not possible to be found in the data. We suspect that the data categories were outdated especially for old responses. In those cases, we used the same label as for NUTS 1. This occurred for UKG0 (urban), UKL3 (urban-city of London), UKL0 (Urban),

[5] Due to the great time span of our observations (1973-2015), we used the regional classification from 2006 (in cases of name change in the region we consulted Eurostat). To control for problem in this partly reductionist approach, we replicated model 4 with observations from 2002 to 2010 and the results were similar (Model 3, Table 1A, Appendix 2).

UKK (Intermediate), UKM (Urban), UKN (Intermediate). Similar was the phenomenon with category DE802 and DE42 for Germany who seem to coincide and treated as being the same.

After having classified all responses in one of the three levels, the next step was to develop relevant variables. We computed two dummy variables. One was taking the value of 1 in case a respondent was living in an Intermediate area (and zero in all other cases) and a second dummy taking the value of 1 in case a respondent was living in an urban area (and zero in all other cases). We refer to these dummies as urbanization dummies.

Model

To estimate the effect of area of living upon satisfaction, we formulated the following generic model:

$$SWB_{ijt} = b0 + b_1\ Urbanization_j + b2\ Individual_{ijt} + b3\ Place\_Characteristics_{jt} + b4\ Interactions\_of\_Place\_of\_Living_j + x_{ij} + t_t + \varepsilon_{ij}$$

Where SWB_{ijt} is the reported subjective well-being for individual i in county j in year t. $Urbanization_{jt}$ is a vector comprised of the two dummies capturing whether an individual lives in a rural, intermediate or urban area. $Individual_{ijt}$ is a vector of individual characteristics and is comprised of the variables capturing individual's age, gender, occupation (described in Appendix 1), political views (described in Appendix 1), marital status (described in Appendix 1), financial condition (described in Appendix 1) and social life with friends. $Place\_characteristics_j$ is a vector with variables related to the place of living and specifically its distance to the sea, six dummies indicative the country the respondent lives, and the per capita GDP of the country (for years 2000 on). Finally, $Interactions\_of\_Place\_of\_Living_{jt}$ is a vector of variables in interactions. Specifically, it includes the interaction between GDP per capita and the two dummies of urbanization, interaction between marital status and the two dummies of urbanization and the political views and financial situation interacted with the two dummies of urbanization. We provide frequencies for the variables in Table 1.

Aforementioned variables were made available with the dataset and were part of the Eurobarometer surveys (except for the coastal dummy and the variables on per capita GDP). The inclusion of dummy for the distance from sea is important since numerous recent paper report a positive relation between life satisfaction and living close to the sea and could dump

potential differences of urban vs. rural areas (Garrett et al. 2019)[6]. To construct this dummy, we followed the same process and sources with the construction of urbanization from NUTS 3 to NUTS 2 level. The dummy was taking the value 1 in case the county was coastal and 0 otherwise. Then, for the variable on per capita GDP for the countries of our dataset, we downloaded data, available for the period after 2000 from Eurostat (Eurostat, Real GDP per capita). Two variables available in the dataset were not included in the analysis. Those were education in years who had many meaningless observations (e.g., 90 years) and Democratic satisfaction with EU due to very few available observations.

We used our generic model to estimate six different models. The first and second model included only Urbanization as a predictor (controlling for country), the third, fourth and fifth included individual and regional characteristics and the most comprehensive sixth model included on top, interaction effects between individual and regional characteristics and urbanization dummies. Yet, the latter model suffered from multicollinearity and thus enlarged standard errors that hamper hypothesis testing.

Table 1: Frequencies

Countries and Urbanization					
	Rural	Intermediate	Urban	Total	
Belgium	11296	13253	42098	66647	13%
Germany	3420	62954	31962	66006	13%
Denmark	1366	64640	0	98336	19%
France	34995	15572	17462	68029	13%
Italy	12939	13226	42963	69128	13%
Netherlands	0	15661	51384	67045	13%
UK	0	32828	55451	88279	17%
Total	64016	218134	241320	523470	**100%**
Sex					

[6] We enter this variable with caution, since the research stream on sea distance and SWB recognizes coastal areas as those close to the sea (some meters) compared to those far from the sea (some kilometers). We do not believe that our dataset is perfectly suited for that comparison.

Male	251520	48%	Female	271950	52%
Coastal Areas					
Coastal Areas		24.58%	Non-Coastal		75.42%
Occupation			**Marital Status**		
Occ Army		6.19%	Divorced		7.76%
Occ Manager		6.15%	Unammaried never with Partner		4.61%
Occ Professional		13.91%	Unammried previously with Partner		2.07%
Occ Technicians		14.80%	Unamarried living with parnter		4.91%
Occ Clerical		39.85%	Married Base Divorced		24.96%
Occ Services		0.00%	Separated Base Divorced		0.26%
Occ Agricultural		2%	RemarriedBaseDivorced		48.95%
Occ Craft		0.00%	Widowed Base Divorced		0.84%
Occ Plant and Machine Operator		1%			**94.36%****
Occ Elementary		1.23%			
Occ Retired		5.30%	*Remaining 8.2% could not be identified with any of available categories		
Occ Student		1.56%			
Occ Housekeeping		0.38%	**Remaining 5.64% could not be identified with any of available categories		
		91.8%*			

Results

Our dependent variable, SWB is measured with discrete ordered values ranging from 1 to 4. Based on this, we opted for ordered logit and probit regression analysis. Chen and Tsurumi (2010) report that probit and logit analyses are similar. We proceeded with ordered probit models in line with supervisor consultation. In general, OLS is avoided for its predictions that might not be in accordance to the dependent variable and because the errors are heteroskedastic

in cases of categorical dependent measures[7]. Furthermore, we used clustered-robust standard errors (NUTS 2) to account for the fact that our observations are clustered within regions (Arampatzi et al. 2019)[8]. In all our models, we further control for regions and time (fixed effects).

Model 1 & 2. In our first model, we did not include any controls apart from a country dummy (with base country Belgium) and years and regions fixed effects. For the years fixed effects the reference point is year 1973. For the regional fixed effects base point is BE10. We run this model using ordered probit regression in STATA. STATA was not able to report the Wald test for the regression (which is a test based on a Chi-squared distribution) that all coefficients are simultaneously different from zero. A discussion over the topic on STATA website reports that the problem might arise due to less clusters than the total explanatory variables (including fixed effects) and/or Singleton Dummies (dummies with a single non-zero observations). We inspected the dataset and specifically the observations for all years and clusters to find potential Singleton dummies in fixed effects. We were not able to find any Singleton dummies and thus we argue that the missing Wald test associates with the small number of clusters compared to the large number of explanatory variables. Indeed, according to Professor Mark Schaffer[9] in the same STATA forum, lack of Wald test should not raise doubts over the reliability of tests for particular independent variables.

Thus, we are able to conclude from Table 2, Model 1 that people living in intermediate regions are experiencing higher SWB that people in rural areas. Moreover, people living in urban areas do also experience higher subjective well-being than people in rural areas. To compare whether people living in urban areas are higher in SWB, than those living in intermediate areas, we run the regression excluding citizens in rural areas (since it is difficult to compare coefficients of probit regressions). We report the results under Model 2 in Table 2.

Since, probit regression coefficients are not interpretable, we used the command margins, which can give us the difference in subjective well-being probability from an increase of one point in another variable (in our case the urbanization dummy variables capturing the place of residence). We report this in Figure 1. As we see in Figure 1, people living in Urban areas are

[7] We included an OLS model in the robustness analysis.
[8] We follow previous literature to cluster at the geographical variable and not the time variable (Arampatzi et al. 2012; Okulicz-Kozaryn and Mazelis 2018). Furthermore, we followed Arampatzi et al. (2019) in their advice against the use of multilevel modelling techniques.
[9] See the STATA link on the relevant issue: https://www.stata.com/statalist/archive/2006-09/msg00851.html

more probable to report higher satisfaction (SWB=4) compared to people living in rural or intermediate counties. Indeed, for both urban and intermediate counties, their positive effect on SWB is reflected upon increase in the probability to report the highest subjective well-being (SWB=4), as well as decrease in the probability to report lower SWB (i.e., SWB=1,2,3). If we take for instance, a person that has reported SWB equal to 4, ceteris paribus has a higher probability of 16% to be living in an urban area than a rural area, and 14% to be living in an urban than an intermediate area. On the other hand, a person experiencing SWB equal to 1 is 3.6% (3%) less probable to live in an urban (intermediate) place. Our findings that intermediate in urbanism places are between rural and urban concerning SWB do not support the view of Okulicz-Kozaryn (2017). There, the author showed that intermediate places might lose the positive effects of good natural environment of rural areas and still do not have the city amenities making them lying somewhere in the lowest part of the distribution. In the case, of our thesis citizens of intermediate places seem to have more similar, yet better, "fate" to that of rural citizens in regards to SWB.

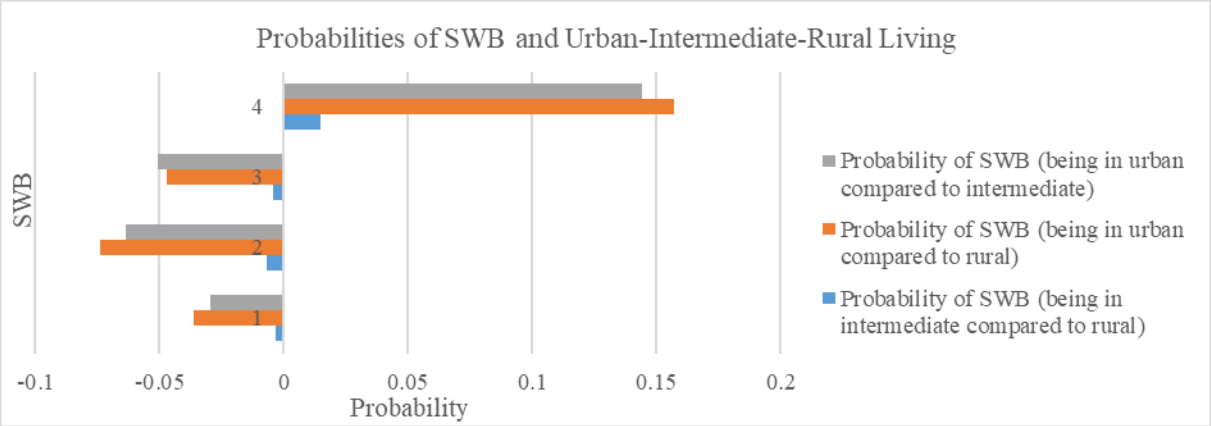

Figure 1. Probabilities of SWB and Urban-Intermediate-Rural Living (Model 1 & 2)

Model 3 & 4 & 5. In the third model, we included further variables. Specifically, we included country dummies, variables capturing the marital status of the respondent, her occupation, age and gender, the frequency of meeting with friends, her political views, her satisfaction with democracy, her financial situation and a dummy capturing whether the county is coastal or not. When including all variables, available observations dropped to 22335 and the years analyzed curtailed to only 2003 and 2004. Given this consideration, we excluded some variables from our analysis to increase the available sample in model 4. Both model 3 and 4 supported findings

of model 1 and were meaningful in regards to the direction of the effect of the other independent variables. For instance, according to theory -and replicated here- women tended to report higher levels of SWB (Frey and Stutzer 2002; Gerdtham and Johannesson 2001).

In line with what we did before, we calculated a model similar to model 2 (model 5), so as to report all relevant margins in Figure 2 (based upon model 4 and 5). Figure 2 shows that the effect of urbanization are magnified in the model with more control variables and the model seems to perform according to theory. To examine, whether the more complete model 4 increases the explanatory power and the addendum of variables is advantageous, we compare the LogLikelihood of the two models, using the Likelihood Ratio[10]. We tested the two models and found support for the use of a more comprehensive in terms of variables model (LR=1675495.88, which is higher than the χ^2 critical value for degrees of freedom equal to the increase in independent variables $\chi^2_{0.05(23)}$=35.172).

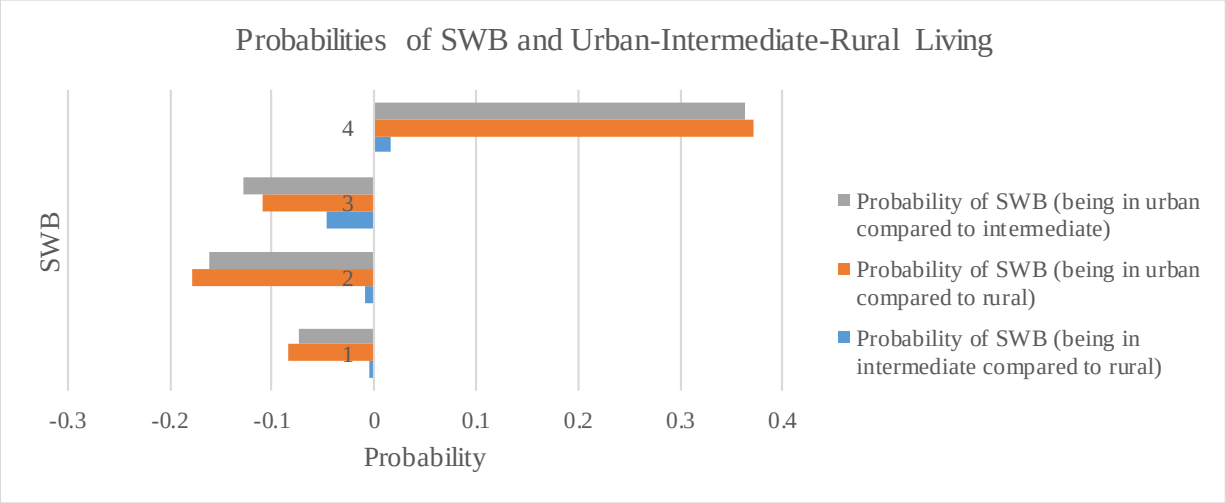

Figure 2. Probabilities of SWB and Urban-Intermediate-Rural Living (Model 4 & 5)

Model 6. The final model introduces interaction between our main independent variables of urbanization and individual and regional characteristics. The reason for running this model on top of previous was our intention to study particular predictions from the literature review, which could be tested using interactions. Before, running this model, we tested it for

[10] Due to the use of robust clustered standard errors, STATA reports the Pseudo-LogLikelihood, which is not perfect for the comparison of models. We checked whether the Pseudo Likelihood is different from the LogLikelihood (when not estimating robust standard errors) and they are the same, so we proceeded this way. LR=-2x($\ln L_{restricted}$-$\ln L_{full}$)=-2x[-511684.5-(-326063.44)]= 1675495.88

multicollinearity. Our intuition was that many predictors using interactions of already existing predictors of previous models will develop high covariance between independent variables. Our analysis confirmed our suppositions[11] and VIF was high for all variables and more importantly for our two main urbanization predictors. We report the model, even though we do not comment extensively, since standard errors are highly inflated (compare them with those of previous models).

Independently of the performance of the model, the relationships that we decided to test where the following. Firstly, we included three dummies for age designating people younger than 25, between 25 and 50 and over 50 to capture the U-shape relationship of age and happiness previously reported by Blanchflower and Oswald (2008). Partial support for this is provided from the negative coefficient of Age25_50, which has a basis category people older than 50. After this, we planned to interact all those age dummies with urbanization (the model is not reported due to more extreme multicollinearity). Our goal was to see whether younger people are more satisfied when living in urban places (Plouffe and Kalache 2010; Whisler et al., 2008), yet we did not find support for any age differences. We further interacted political views (left and right) with urbanization dummies. Our intuition was that due to homogeneity of people in rural areas (Layard 2011 [2005]), right people might experience higher SWB in rural than urban areas. We did not find support for this, but there was an indication of more satisfaction of left people in urban areas. We further introduced economic variables (GDP per capita) for the years 2000 to 2015 for all countries of our sample and we further interacted them with the dummies on urbanization. We wanted to test, the idea that distinctions between happiness will be lower in countries with high development since rural citizens can have similar benefits to urban citizens (Moomaw and Shatter, 1996). More specifically, for more economic developed countries public goods are equally distributed in urban and rural areas (Tiebout, 1956; Stiglitz 1983, 2000) partially subtracting from a typical happiness premium offered to city dwellers (Requena 2016; Okulicz-Kozaryn, 2015; Berry and Okulicz-Kozaryn, 2009). All variables were dropped due to multicollinearity or had non-significant effects upon SWB. Another interaction we included wanted to test the importance of social relations in urban and rural areas. According to some authors, isolation in urban environment is more an explicit conscious strategy to deal with the overload of interactions (Lederbogen et al., 2011; Sørensen, 2014). At the same time,

[11] To receive collinearity diagnostics, we run an OLS regression with robust clustered standard errors asking for the variance inflation factors (VIF). We did this through OLS, since STATA does not support this in probit regressions.

other researchers has shown the significance of social connections in rural areas where the development of a social cycle is more challenging (Philip and Shucksmith 2003). To study these effects we developed a variable that merged married and remarried people and a second variable compiled from all unmarried people. Then, we interacted those variables as well as the variable on frequency of seeing friends with the urbanization predictors to see whether social connections and marriage are more important for rural (compared to urban) dwellers. We did not find support for this hypothesis. Finally, we interacted the variable capturing financial situation with the two urbanization dummies. We wanted to test whether people in urban places due to the importance of consumption (Glaeser, Kolko and Saiz 2001) place more significance in good economic situation as a determinant for their SWB. We did not find support for this as well, even though as we said the high multicollinearity make model 6 highly problematic for inference.

Table 2. Ordered logit regression: Dependent variable Subjective Well-being

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
Living in Intermediate Area	0.048***		0.242***	0.0555***		0.376***
	(0.003)		(0.011)	-0.003		(0.083)
Living in Urban Area	0.509***	0.452***	0.366***	1.279***	1.208***	0.228***
	(0.018)	(0.031)	(0.027)	(0.028)	(0.029)	(0.081)
Living in Denmark	1.692***	1.637***	0.918***	2.305***	2.108***	1.248***
	(0.0284)	(0.031)	(0.034)	(0.035)	(0.038)	(0.061)
Living in Germany	0.062***	0.057***	-0.431***	0.835***	0.822***	-0.524***
	(0.017)	(0.019)	(0.033)	(0.028)	(0.030)	(0.043)
Living in France	-0.252***	-0.250***	-0.524***	-0.300***	-0.299***	-0.252***
	(0.004)	(0.004)	(0.012)	(0.003)	(0.003)	(0.005)
Living in Italy	-0.065***	-0.070***	0.267***	2.231***	2.203***	-0.337***
	(0.0176)	(0.0198)	(0.048)	(0.057)	(0.062)	(0.070)

Living in the Netherlands	1.058***	1.049***	0.468***	1.716***	1.700***	0.407***
	(0.019)	(0.021)	(0.033)	(0.026)	(0.028)	(0.040)
Living in the UK	0.858***	0.850***	0.581***	1.683***	1.665***	0.394***
	(0.018)	(0.020)	(0.033)	(0.0312)	(0.034)	(0.040)
Unammaried never lived with Partner			0.169***	-0.183***	-0.185***	-0.068***
			(0.052)	(0.017)	(0.018)	(0.025)
Unammried previously lived with Partner			-0.055	-0.182***	-0.188***	0.066
			(0.060)	(0.024)	(0.026)	(0.060)
Unamarried living with Parnter			0.327***	0.172***	0.177***	0.242***
			(0.043)	(0.017)	(0.018)	(0.028)
Married			0.419***	0.179***	0.171***	0.249***
			(0.040)	(0.013)	(0.014)	(0.019)
Separated			-0.072	-0.149***	-0.138*	-0.016
			(0.077)	(0.050)	(0.054)	(0.052)
Remarried			0.354***	0.264***	0.267***	0.338***
			(0.087)	(0.014)	(0.015)	(0.019)
Widowed			0.128**	-0.153***	-0.164***	-0.090**
			(0.053)	(0.027)	(0.028)	(0.035)
Unmarried*Intermediate						-.098
						(0.075)
Unmaried*Urban						-.049
						(0.068)
Married&Remarried*Intermediate						-.031
						(0.024)
Married&Remarried*Urban						.034

				(0.03)
Occ_Managers	0.031	0.108***	0.103***	0.055***
	(0.036)	(0.013)	(0.014)	(0.020)
Occ_Professionals	-0.117***	-0.002	-0.011	-0.019
	(0.038)	(0.012)	(0.014)	(0.017)
Occ_Technician	-0.093***	-0.121***	-0.125***	-0.119***
	(0.027)	(0.012)	(0.013)	(0.016)
Occ_ClericalArmy	-0.175***	-0.057***	-0.077***	-0.122***
	(0.034)	(0.013)	(0.014)	(0.017)
Occ_Agriculture	-0.105***	-0.116***	-0.130***	-0.120***
	(0.037)	(0.025)	(0.027)	(0.027)
Occ_PlantMachineOper	-0.178***	-0.264***	-0.264***	-0.290***
	(0.046)	(0.040)	(0.040)	(0.040)
Occ_Elementary	-0.561***	-0.612***	-0.642***	-0.643***
	(0.052)	(0.032)	(0.035)	(0.035)
Occ_Retired	-0.033	-0.072***	-0.077***	-0.174|**
	(0.041)	(0.019)	(0.021)	(0.022)
Occ_Student	0.256***	0.323***	0.324***	0.244***
	(0.047)	(0.028)	(0.030)	(0.031)
Occ_Housekeeping	-0.242***	-0.311***	-0.345***	-0.351***
	(0.074)	(0.055)	(0.058)	(0.053)
Gender (female 0, male 1)	-0.056***	-0.068***	-0.082***	-0.071***
	(0.020)	(0.011)	(0.011)	(0.012)
Age	-0.001			0.001*
	(0.001)			(0.000)

Age0_25				0.003***
				(0.001)
Age25_50				-0.003***
				(0.000)
Dem_Sat_Country	0.261***	0.371***	0.368***	0.344
	(0.015)	(0.011)	(0.012)	(0.011)
Dem_Sat_EU	0.063***			
	(0.012)			
EUMembership	0.144***			
	(0.014)			
Friends	0.048***	0.045***	0.044***	0.061***
	(0.011)	(0.006)	(0.007)	(0.013)
Friends*Urban				-0.017
				(0.015)
Friends*Intermediate				-0.017
				(0.017)
Pol_Views_LeftRight	0.012***	0.020***	0.021	0.011***
	(0.003)	(0.002)	(0.002)	(0.004)
Pol_Views_LeftRight*Urban				0.007*
				(0.006)
Pol_Views_LeftRight*Intermediate				0.010
				(0.005)
Coastal	-0.429***	-1.395***	-1.380***	-0.090***
	(0.024)	(0.030)	(0.033)	(0.023)
Finance	0.056***			-0.090***

			(0.016)			(0.023)
Finance*Intermediate						-0.019
						(0.028)
Finance*Urban						-0.008
						(0.0281467)
Variables on GDP per Capita per Country						Ommitted or Not Significant
Variables on GDP per Capita per Country Interaction with the two dummies of Urbanization						Ommitted or Not Significant
Region fixed effects	YES	YES	YES	YES	YES	YES
Years fixed effects	YES	YES	YES	YES	YES	YES
Number of NUTS 2	189	157	171	189	157	189
Observations	523470	459454	22231	348228	305399	113229

Reference category for country dummies was Belgium, for marital status was divorced, for occupation was Army, for age dummies respondents above 50. Clustered at NUTS2, robust standard errors in parentheses *** p < 0.01, ** p < 0.05, * p < 0.1.

Robustness Analysis

Regression Analysis using OLS and Clusters. Robustness analysis was conducted to examine the results obtained from ordered probit regression. We used an OLS regression, where we introduced clusters following previous researchers (Okulicz-Kozaryn and Mazelis, 2018). The decision to use linear regression as a comparison, -given the shortcomings- apart from its simplicity makes our results relevant to the majority of studies in the field (Ballas and Tranmer, 2012). We report the results of the OLS regression, which uses the same variables as model 4, in Table 1A in Appendix 2 (model 1). The results are in the same direction with the results reported in Table 2. People in urban areas reporting higher satisfaction, followed by people in intermediate and rural areas.

Conclusion and Limitations

Previous research is inconclusive in regards to happiness of urban and rural citizens. Other researchers support a positive relation between SWB and urbanization (Glaeser, 2011), other a negative (Winters and Li, 2017), while other remain inconclusive (Bergstad et al., 2012). In our report, we find support for a positive effect of urbanization upon SWB. We examined seven European countries and answers of half a million citizens spanning from 1973 to 2015 in regards to their experienced level of well-being. Across all our models, we found support that people in urban places experience higher levels of SWB. Particularly, we show that on average people the same person living in an urban than a rural place has 36% higher probability to report the highest SWB (Figure 2).

Nonetheless, our study has certain limitations. Primarily, although we have numerous observations, those come from what we name First World, where differences in Urban and Rural areas are less chaotic (Requena, 2016) as in less developed areas of the world. This indeed, hinders potential generalizations of our findings to other areas, since there the positive effects of urbanization might be different (e.g., lower due to pollution in cities, higher due to services deprivation in rural places). For instance, what MacKerron and Mourato (2013) report as an advantage of green space might not be equally important in the less polluted urban Europe compared to the more polluted urban developing country. Our effort to control for this by introducing economic variables of per capita GDP was not fruitful due to multicolliearity in the predictors.

Secondly, the study focused on secondary data coming from a pan European survey. This brings us with certain concerns over biased results. Although, we cannot estimate the magnitude and direction, we can, for instance, to assume that people in rural location stay there less by their free will and more by their lack of occupation skills to move to cities. In antithesis, we can also assume that urban dwellers are freer to opt for urban versus rural living. A better design would have been to use a more control technique (e.g., a hypothetical experiment) or matching. The latter technique was employed in a recent PhD thesis at Erasmus University by Efstratia Arampatzi (Arampatzi 2018) as well as other researchers (Tiefenbach and Kohlbacher, 2014). The basic intuition of matching is that you try to compare SWB of people in urban, intermediate and rural areas that do not differ in other things (e.g., demographics) except for place of residence.

Thirdly, our dataset did not provide direct information over NUTS 3 level, leading us to aggregate data. For instance, the negative relation between the distance from the sea and SWB, might be among others an artifact created by aggregation (see also the discussion of ecological fallacy in similar research in footnote 10 by Arampatzi et al., 2019; Primo, Jacobsmeier and Milyo, 2007). Further studies should employ a dataset with observations at different levels and optimally at NUTS 3 level.

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Appendix

Appendix 1: Data

Data Clearing

The first step of data clearing was to take out observations without relevant data over NUTS. Those were the first 3924 observations. Subsequently, a few observations from Irish respondents (this was inferred from the similar ids as for example 8000565, 8000917, 8002996) seemed to have been put accidentally in other countries (e.g., between respondents of Belgium). These observations had to been erased as well, since apart from the country, in the NUTS category were identified with other country (in the case of the example Belgium). The observations that were subtracted following this method were 698. Moreover, we deleted 540 observations of Belgians that had reported as area of living the Netherlands and specifically NL42, which is the county of Limburg (which borders Belgium), 557 observations from Luxemburg that designated FR 24 as living NUTS.

Occupations Estimators

Based on the data given for the jobs of the respondents we separated them in 13 categories, following the ESCO (https://ec.europa.eu/esco/portal/occupation) 9 first level categories. Given that the respondents reported the three digit classifications, we used only the first digit for our categorizations. We added some further categories, which were not in the ESCO list. Those were unemployed, retired or unable to work due to illness, student and housekeeping. Below, you can see the list developed. Further, some answers that did not provided number were coded. "Middle management, other management" was coded with 2, "Responsible for ordinary shopping, etc." was coded as 5, except for cases that in the column of previous job, respondents reported that they never worked in a paid condition. In the latter case, we coded it with 13. "Employed position, not at a desk, but in a service job" was coded with 5, "Employed professional (employed doctor, lawyer, etc.)" and "Professional (lawyer, medical practitioner, etc.)" were coded with 2, "General management, director or top management", "Business proprietors, owner (full or partner" of a company)" and "Supervisor" were coded with 1. "Farmer" and "Fisherman" were coded as 6.

Analytically:

1. Armed forces occupations

2. Managers
3. Professionals
4. Technicians and associate professionals
5. Clerical support workers
6. Service and sales workers
7. Skilled agricultural, forestry and fishery workers
8. Craft and related traders workers
9. Plant and machine operators and assemblers
10. Elementary occupations
11. Unemployed or temporarily not working (Base Category)
12. Retired or unable to work
13. Student
14. Housekeeping

Codes for other Variables

We further changed the categories of political, friends, LS into numbers. For political, "Never" was coded with 1, "Occasionally" with 2, "Frequently" with 3. For friends, "Never" was coded 1, "Rarely" was coded with 2, "From time to time" was coded with 3 and "Often" was coded with 4. For LS, , Demographic satisfaction with country and EU, "Not at all satisfied" was coded with 1, "Not very satisfied" was coded with 2, "Fairly satisfied" was coded with 3 and "Very satisfied" with coded with 4. For EU, "Bad thing", was coded with 1, "Neither good nor bad thing" was coded with 2 and "Good thing" was coded with 3. For financial, "Worse" was coded with 1, "Same" was coded with 2 and "Good" was coded with 3. For marital, they were many observations not giving a particular or meaningful characterization. Those observations were excluded. The remaining were coded as following. "Divorced" was coded with 1, "Unmarried having never lived with a partner" was coded with 2, "Unmarried having previously lived with a partner" was coded with 3, "Unmarried currently living with partner"

was coded with 4, "Married" was coded with 5, "Separated" was coded with 6, "Remarried" was coded with 7, "Widowed with 8.

Appendix 2: Additional Models – Robustness Checks

Table 1A: OLS Dependent variable Subjective Well-being, Ordered logit regression: Dependent variable Subjective Well-being (2002-2010)

	(1)	(2)
VARIABLES	OLS	Ordered Probit for Years 2002-2010
Living in Intermediate Area	0.032***	0.559***
	(0.002)	(0.012)
Living in Urban Area	0.700***	1.603***
	(0.017)	(0.044)
Living in Denmark	1.192***	2.405***
	(0.018)	(0.041)
Living in Germany	0.436***	0.511***
	(0.018)	(0.042)
Living in France	-0.190***	-0.352***
	(0.002)	(0.011)
Living in Italy	1.180***	2.422***
	(0.038)	(0.080)
Living in the Netherlands	0.940***	1.453***
	(0.014)	(0.034)
Living in the UK	0.929***	1.550***
	(0.018)	(0.042)
Unammaried never lived with Partner	-0.112***	0.1992241
	(0.001)	0.032583

Unammried previously lived with Partner	-0.114***	0.004
	(0.014)	(0.035)
Unamarried living with Parnter	0.095***	0.305***
	(0.009)	(0.033)
Married	0.097***	0.404***
	(0.008)	(0.023)
Separated	-0.091***	-0.038
	(0.030)	(0.057)
Remarried	0.148***	0.306***
	(0.008)	(0.029)
Widowed	-0.087***	0.123***
	(0.016)	(0.037)
Occ_Managers	0.057***	-0.223***
	(0.007)	(0.052)
Occ_Professionals	0.002	-
	(0.007)	
Occ_Technician	-0.066***	-0.074***
	(0.007)	(0.025)
Occ_ClericalArmy	-0.034***	-0.231***
	(0.008)	(0.033)
Occ_Agriculture	-0.060***	-0.161***
	(0.014)	(0.032)
Occ_PlantMachineOper	-0.147***	-0.276***
	(0.234)	(0.043)
Occ_Elementary	-0.378***	-0.654***

	(0.022)	(0.045)
Occ_Retired	-0.038***	-0.044
	(0.010)	(0.028)
Occ_Student	0.175***	0.195***
	(0.015)	(0.036)
Occ_Housekeeping	-0.179***	-0.256***
	(0.034)	(0.056)
Gender (female 0, male 1)	-0.179***	-0.045***
	(0.034)	(0.017)
Age	-	-0.003***
		(0.000)
Dem_Sat_Country	0.219***	0.263***
	(0.007)	(0.013)
Friends	0.025***	0.048***
	(0.003)	(0.011)
Pol_Views_LeftRight	0.011***	0.012***
	(0.001)	(0.003)
Coastal	-0.769***	-1.764***
	(0.020)	(0.043)
Region fixed effects	YES	YES
Years fixed effects	YES	YES
Number of NUTS 2	189	166
Observations	348,228	31,590

Reference category for country dummies was Belgium, for marital status was divorced, for occupation was Army, for age dummies respondents above 50. Clustered at NUTS2, robust standard errors in parentheses *** p < 0.01, ** p < 0.05, * p < 0.1.