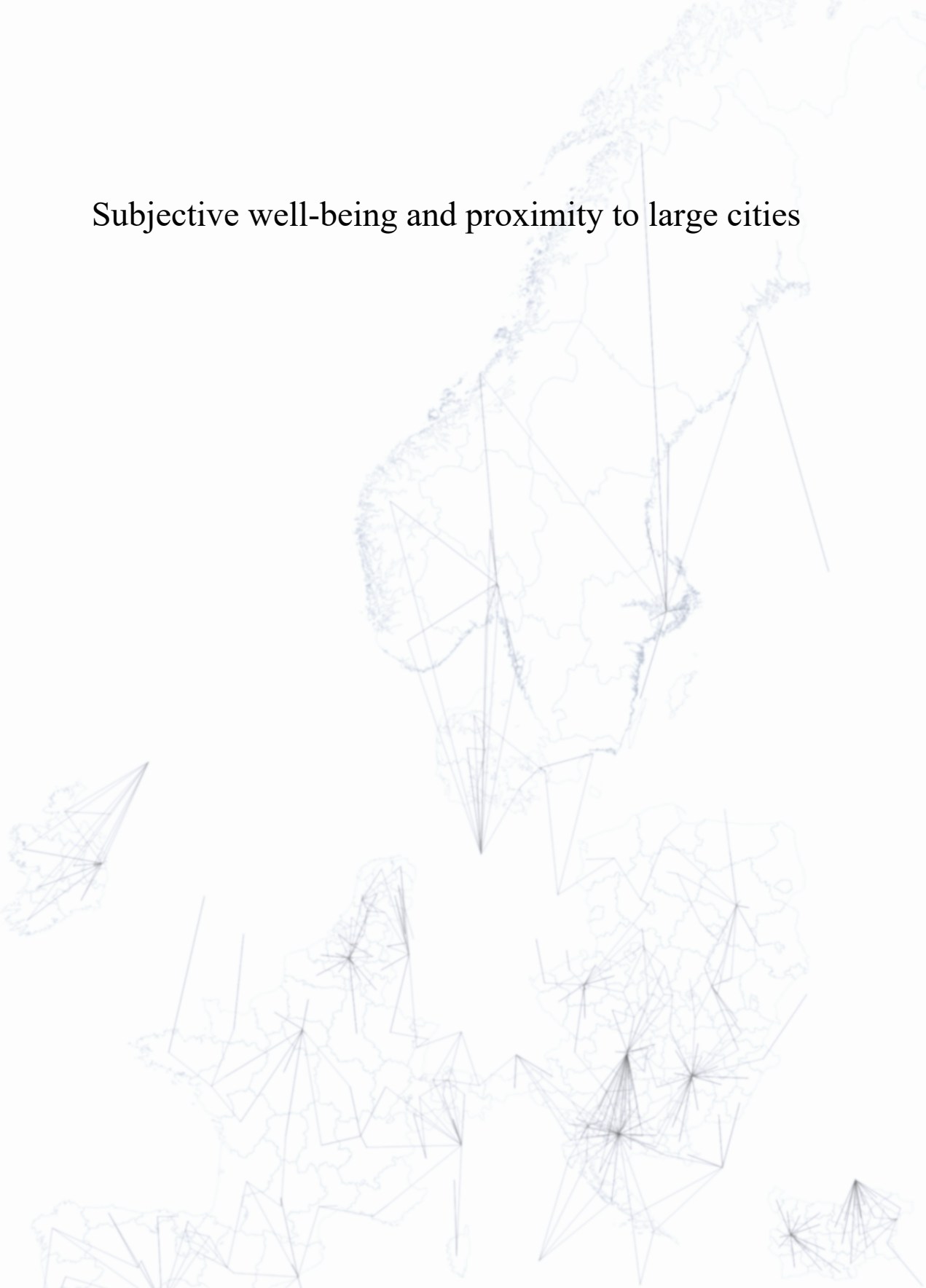
Subjective well-being and proximity to large cities



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Abstract
Recent findings indicate that subjective well-being is lowest in the largest urban region of countries with developed economies. An important factor in this urban paradox is the possibility of borrowing urban benefits for people living in proximity of these large urban areas. Based on this premise, this research aims to combine spatial and quantitative analysis to answer its main research question: "How is subjective well-being influenced by residential proximity to a large urban area?", while also dissecting some national differences. This thesis draws on secondary data from the European Social Survey (ESS) 2018 to conclude that there is a negative linear relationship, with little national differences.

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Introduction

By mid-century 68% of the world population is projected to live in urban areas (United Nations, 2018). This will mean that at that time, and accounting for the total population increase, the urban population has increased by 2.5 billion people, who will live in larger and more denser cities to accumulate for this growth. This could prove impactful for happiness across the globe. Previous research by Morrison & Weckroth (2018) shows that, as economic development goes up, subjective well-being is generally lower in the largest cities of country as opposed to the more rural areas. This so-called "Urban Paradox" is found in many countries in Europe (European Commission, 2013), Northern America (Berry & Okulicz-Kozaryn, 2015) and similar findings have emerged in Asia (Chen et al., 2015). As 90% of projected urban growth will occur in both Africa and Asia (United Nations, 2018), a better understanding of the urban paradox will be beneficial for our quickly urbanizing world.

This research aims to look closer at a compositional factor that contributes to explaining the urban paradox, the borrowing of urban benefits. Similar to the concept of borrowed size (Alonso, 1973), people who live outside of the urban area can still gain from its benefits if sufficient infrastructure is in place without being affected by the negative aspects of living in a large city (e.g., higher costs of living, lack of green space). Based on this concept, this research takes a closer look at how subjective well-being is influenced by place of residence and its proximity to an urban area. Geographical and quantitative analysis in seventeen European countries is carried out to answer the following research question: How is subjective well-being influenced by residential proximity to a large urban area? Subsequently, I will dissect some national differences that can be seen in this regard.

This thesis is structured as follows. First, the most important established factors that constitute to subjective well-being and the urban paradox will be outlined in the literature section. This is followed by the methodology section that explains how geographical analysis contributed to quantitative analysis. The results of which will be laid out thereafter. The thesis concludes by linking these results back to the literature and some policy recommendations. Furthermore, this section will also discuss the shortcomings of this research, combined with some suggestions of possible future research strategies.

Theoretical Framework

Subjective well-being is defined by Morrison (2021, pp. 781-782) as "the experience of health, happiness, and prosperity. It includes having good mental health, high life satisfaction, and a sense of meaning or purpose". Historically well-being has been measured objectively by for example looking at income or education, but as the availability of survey data grows, the possibility of analysing well-being subjectively increases. Diener (2006) describes subjective well-being as the umbrella term for the valuations people make of their own life. Next to being an additional measure of quality-of-life Stiglitz et al. (2009) argue that subjectively measuring well-being also helps create a better understanding of its determents, one that reaches beyond people's material conditions and income. These determents, however, are near impossible to dissect all. Often the question asked to determine subjective well-being (like the one used in this research), contains some similar part of the following phrasing: "Taking all things together…". This taking into consideration of all the things hints at many determents of subjective well-being. A well-established determent of subjective well-being is age, research by Blanchflower & Oswald (2006) shows that happiness and well-being are at their lowest around middle age. This U-shape is found in both developed and developing countries. Other broad domains in which determents for subjective well-being can be found are income &

wealth, housing, health status, work/life balance, education & skills, social connections, civil engagement & governance, environmental quality and personal security (Boarini et al., 2012).

Most relevant for this research is the determent of where people live. As Burger et al. (2020) point out in the World Happiness Report of 2020 (Helliwell et al., 2020), urban populations tend to be happier on average than rural populations. Research by Veenhoven & Berg (2013) shows a strong positive correlation between urbanization and happiness. However, controversy can already be found in the classic essay *Urbanism as a Way of Life* by Wirth (1938) where he addresses determents like social connections in the context of living in a city, weakening the kinship bonds, while also praising the city as a symbol of civilization. Conversely, negative aspects of living in a city include: a lack of green space (MacKerron & Mourato, 2013), higher levels of pollution (MacKerron & Mourato, 2009), higher costs of living (Glaeser et al., 2016).

Research by Morrison & Weckroth (2018) finds a negative relationship between subjective well-being and residence in the largest metropolitan centre of a developed economy. Despite these urban regions often being the large providers of employment and economic growth, residents report lower levels of well-being compared to those living in smaller cities and rural areas. A visualization of this can be seen in figure 1.

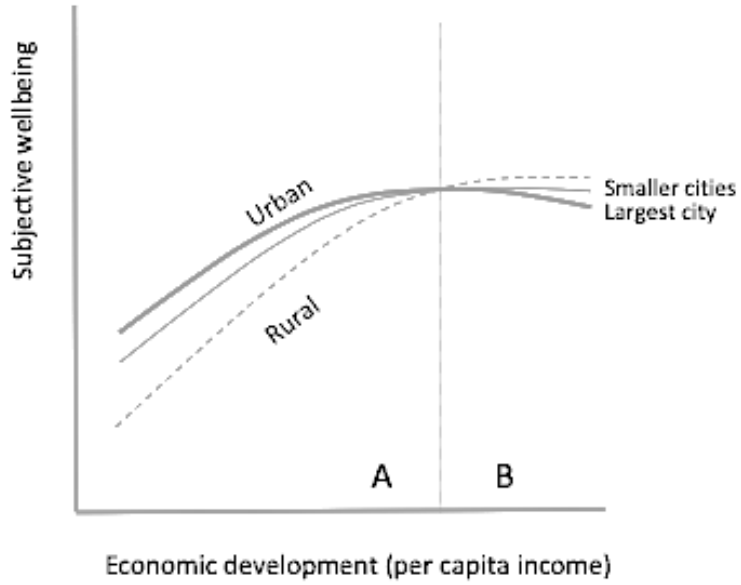

Figure 1: The urban paradox (Source: Burger et al., 2020)

The literature on subjective well-being highlighted several factors explaining the urban paradox. Veenhoven (1994) found that rural people who are generally thought to have unhappy characteristics (single, unemployed and migrant) tend to move to cities. This results in the city being generally unhappier by composition. Another compositional explanation is that urban agglomeration primarily raises the income and well-being of people with a tertiary education, increasing the gap with a larger number of people who are less educated (Morrison, 2014). However, the most important factor for this research is contextual, relating more to spatial characteristic distinctions between the highly urban areas in contrast with the smaller settlements and rural areas. Meijers & Burger (2017) found that countries with developed economies tend to have better infrastructure, which increases mobility between the urban and rural. This allows rural residents to 'borrow' urban benefits without having to experience the negative effects of living in a large city as previously mentioned (lack of greenspace, higher

costs of living, higher levels of pollution). Their research was inspired by the concept of 'borrowed-size' (Alonso, 1973), which Meijers & Burger (2017, p. 271) phrased as follows: "a situation in which especially smaller cities located within larger megapolitan complexes do perform more favourable due to their access to the agglomeration benefits of larger neighbouring cities". Alonso uses the concept to explain why smaller cities positioned close to large metropolitan areas perform relatively better in providing their residents with services and facilities than more isolated cities. He stresses the importance of accessibility and network connectivity in order for the concept of borrowed size to take effect. In their own expansion on the concept, Meijers & Burger found that many residents of rural areas in developed economies are no longer dependent on farming but can live and work in proximity of larger urban centres and are able to 'borrow' the positive effects of these much larger cities.

The most important theory mentioned above is visualized in figure 2, the conceptual model. The model shows how the most important factors mentioned in the literature relate to the urban paradox. Explicitly depicted is the aspect of proximity to a large urban area, derived from the contextual factor of borrowing urban benefits (Meijers & Burger, 2017), as this is central in this research. The other compositional factors (Veenhoven, 1994; Morrison, 2014) are grouped and connected to the urban paradox as well, which in its turn is linked to subjective well-being.

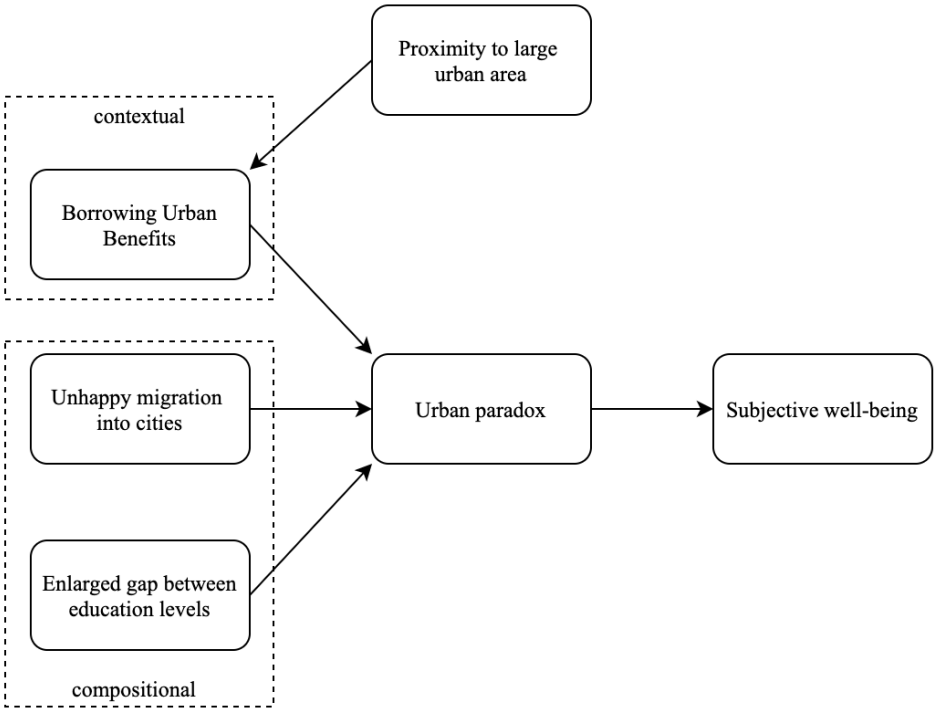

Figure 2: Conceptual model

Based on this theoretical framework, I offer the following two hypotheses: (1) subjective well-being is influenced negatively as distance to an urban centre increases, while taking compositional socio-demographic factors into account; and (2) this will be relatively similar for each of the countries in this research.

Methodology

To test these hypotheses, this research uses a combination of geographical and statistical analysis. Given the nature and scale of this research, it has wat Clifford et al. (2016) would consider extensive design or a 'large-n' type of study. For the empirical analysis, individual-level data from the European Social Survey (ESS) is used. This biennially academically driven survey is conducted across Europe in over 30 countries since 2001. As in every edition the

survey covers the subject of subjective well-being, at time of writing the latest edition, round 9, (ESS, 2018) is used for this research. In that round the most important question relating to subjective well-being is phrased as:

"Taking all things together, how happy would you say you are?"

Answers were given on a scale from 0 to 10, as well as the options of not knowing or refusing to answer. In addition to this, the ESS also provides socio-demographic data on some of the compositional determents discussed in the theoretical framework above. This includes age, education and marital status. Age is calculated from year of birth, education is categorized according to a simplified International Standard Classification of Education (ISCED) scale ranging from ISCED I, less than lower secondary schooled to ISCED V, having completed tertiary education. Unfortunately, the ESS does not disclose a specific enough relationship status to control for being single or in a relationship/married but does provide data on divorce. The individual level information derived from the ESS also includes some spatial context. Data is provided at European Nomenclature of Territorial Units for Statistics (NUTS) levels ranging from 1 to 3. As the more topographical precise data would be better, this research omits countries on which data is provided on a NUTS 1 level (e.g., Germany, Italy and UK), together with countries that also classified as one single region because of their comparatively small size (Iceland, Cyprus and Montenegro). Table 1 shows an overview of the countries used in this research and how many regions they contain at their respective NUTS level.

Country	NUTS Level	Number of regions	Observations
Austria (AT)	2	9	2499
Belgium (BE)	2	11	1767
Bulgaria (BG)	3	28	2198
Switzerland (CH)	2	7	1541
Czechia (CZ)	3	14	2398
Denmark (DK)	2	5	1572
Spain (ES)	2	19	1601
France (FR)	2	22	2010
Croatia (HR)	3	21	655
Hungary (HU)	3	20	1225
Ireland (IE)	3	8	2216
Netherlands (NL)	2	12	1673
Norway (NO)	2	7	1406
Poland (PL)	2	16	1500
Portugal (PT)	2	7	1055
Sweden (SE)	2	8	1539
Slovenia (SI)	3	12	1318
Slovakia (SK)	3	8	1083

Table 1: Country statistics

In order to measure urban proximity for each of these regions, I have adapted the classifications of the European Commission (2013) for urban centres on the basis of their population size. As Morrison & Weckroth (2018) found subjective well-being is lowest in the largest metropolitan regions of a country, the two smallest categories (S: 50 000 – 100 000 inhabitants and M: 100 000 – 250 000 inhabitants) were left out of this analysis. The categories that were used are as follows:

L	250 000 – 500 000 inhabitants
XL	500 000 – 1 000 000 inhabitant
XXL (incl. Global)	over 1 000 000 inhabitants

The European Commission (2013) classifies 'Global' cities of over 5 million inhabitants, given the scale of cities in Europe this category has been combined with XXL.

To be able to answer the research question distances were measured for each of the regions mentioned above. This was done with Geographical Information Systems (GIS), software designed to analyse spatial data and solve spatial problems (Jensen & Jensen, 2013). For each of the NUTS regions, albeit 2 or 3, the mean coordinates were calculated. This resulted in point data for each of the regions from which the distance was calculated towards the nearest urban centre. Three different distances were measured from each of these centre points, one to the nearest XXL city, one to the nearest city with over 500 000 inhabitants (so this also included the XXL cities) and lastly, one to a city with over 250 000 inhabitants (so L, XL and XXL cities where all included), a visualization of which can be seen in figure 3. This resulted in three values for each of the regions included in this research. For some of the regions these values were the same for two or all three measures because the city closest was simply a larger city, this is also apparent in similar minimal and maximum values for each of the measurements.

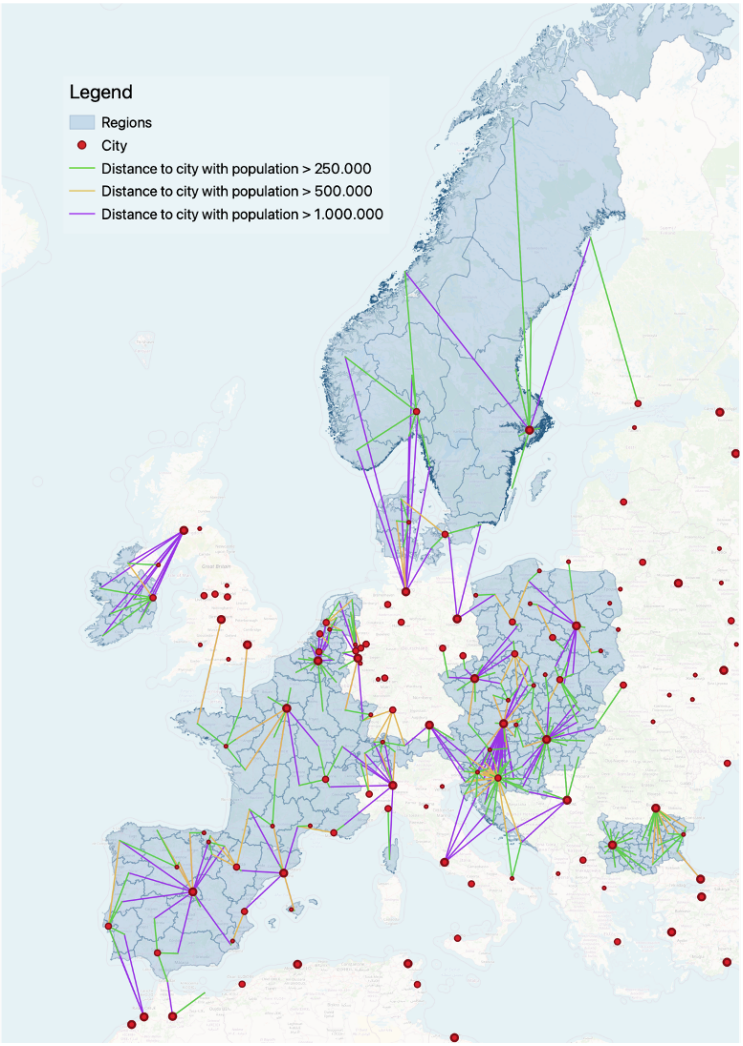

Figure 3: Map of distance analysis

These three measured distances were then merged with the ESS data on a one-to-many basis, with the key-value being the region. This resulted in every respondent having now three new distance ratio variables measured in kilometres. A shortcoming in working this way is the heavy generalization. In reality not everyone living in the same region is in the same proximity of these urban areas, in the conclusion section of this thesis further discussion on this is provided.

Because the dependent variable of subjective happiness can also assumed to be of continuous nature, given its measured on a scale from (0) very unhappy to (10) very happy containing equidistant intervals, linear regression analysis is run, a well-established approach (Punch, 2014). To accommodate for a regression analysis, the control variables for education and divorce data were recoded into dummy variables. Education, where 1 represents "holding a university degree" and 0 represents all other categories usually associated with a lower education as compared to a university degree. Divorce, where 1 represents "ever been divorced or had a civil union dissolved" and 0 represents all other categories. When doing so, precautions were taken to not distort the data itself but only add variables (the distance variables) or recode variables (Education & Divorced) into a dummy. For each step, all ethics considered by the ESS have been taken into account, these can be found in the Declaration of Professional Ethics (International Statistical Institute, 2010). An overview of all variables used in this analysis can be found in Table 2.

Ratio Variable	**N**	**Question asked in ESS/obtained via measuring with GIS**	**Min**	**Max**	**Mean**	**St. dev.**
Subjective well-being	29120	Taking all things together, how happy would you say you are?	0	10	7.44	1.903
Age	29111	Calculated from Year of Birth	15	90	50.54	18.590
Distance to at least L city	29256	Measured with GIS	1.48	986.00	98.40	105.84
Distance to at least XL city	29256	Measured with GIS	1.48	986.00	130.77	115.38
Distance to XXL city	29256	Measured with GIS	1.48	986.00	229.30	181.47
Binary Variable	**N**	**Question Asked in ESS**	**Reference Category**	**Frequency (and %) ref.**	**Other**	**Frequency (and %) other**
Gender	29256	Based on information from contact form data file	Male	13918 (47.6%)	Female	15338 (52.4%)
Education	29256	Country specific questions, coded in ISCED	University Degree	7060 (24.1%)	No University Degree	22196 (75.9 %)
Divorced	29256	Can I just check have you ever been divorced or had a civil union dissolved?	Divorced	4312 (14.7%)	Not Divorced	24944 (85.3%)

Table 2: Descriptive statistics of ratio and binary variables

In order to be able to answer the secondary research question on country differences dummy variables were also created for each of the 18 countries to be run in a second model, as well as an individual linear regression for each of the countries itself.

Results

As mentioned in previous sections, multiple linear regression analysis is used to test whether there is a linear relationship between subjective well-being and proximity to a large urban centre. In these models the variable of subjective well-being is the dependent variable. Model 1 uses the independent variables of the three distance values, age, education, gender and divorce. The second model additionally includes each dummy country variable, excluding the reference category of Norway. Table 3 shows the model summary. With an R^2 of 0.038 for model 1 the explained amount of variance is 3.8%, indicating that despite its overall significance the model has little explanatory power. This is somewhat expected as there are many determents for subjective well-being (Boarini et al., 2012). The R^2 of model 2 at 0.156 is higher, indicating an importance of country of residence.

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.194	0.038	0.037	1.867
2	0.394	0.156	0.155	1.749

Table 3: Regression model summary

In Table 4 can be seen that both models are significant, both having a p-value of 0.000. This means that for both models the dependent variable of subjective well-being is reliably predicted with the independent variables mentioned above.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3941.560	7	563.080	161.523	0.000***
	Residual	100980.656	28967	3.486		
	Total	104922.216	28974			
2	Regression	16329.007	24	680.375	222.329	0.000***
	Residual	88593.209	28950	3.060		
	Total	104922.216	28974			

** = p < 0.1; ** = p < 0.05; *** = p < 0.01.*

Table 4: Regression ANOVA output

Table 5 shows the coefficients, looking at model 1 first, all variables, with the exception of gender are significant. Interesting is that while all three of the distance variables are significant, the variable of distance to at least an L city has a negative linear relationship as opposed to the other two variables. All three unstandardized coefficients B are however very close to 0, which means that for every kilometre of increase in distance from one of the urban

centres, subjective well-being is influenced ever so slightly. For distance to at least an L city, it is decreasing by 0.002 per kilometre, and for distance to XL and XXL cities it is increasing by 0.001 per kilometre. Interestingly, many of the cities that were included in measuring for the *distance to at least L city* variable are XL and XXL cities. Indicating subjective well-being in proximity of L cities is high enough to overturn the negative impact the larger cities have. This is in line with findings by Morrison & Weckroth (2018) where subjective well-being in smaller cities is higher than in the largest cities. The other variables of Age, Divorced and Education are significant as well. This is especially interesting for Age, as the literature would expect not a (negative) linear relationship as there is now, indicating a "decrease in subjective well-being" of 0.011 for every increase of age by a year. But rather a U-shaped course with subjective well-being at its lowest around middle age and increasing again thereafter (Blanchflower & Oswald, 2006). A result that is more in line with the literature is a higher subjective well-being is found for people with a tertiary education (Morrison, 2014). Lastly, Divorced also appears to be significant in predicting subjective well-being, here a negative relationship is found between being divorced or having a civil union dissolved and subjective well-being, which is in line with research by Veenhoven (1994) although being divorced or having a union dissolved is not the same as the determinant compositional factor of being single per se. The only insignificant variable in model 1 is Gender indicating no difference in predicting subjective well-being between male and female.

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**Collinearity Statistics**	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	7.669	0.038		203.670	0.000***		
	Distance to at least L city	-0.002	0.000	-0.096	-8.433	0.000***	0.257	3.892
	Distance to at least XL city	0.001	0.000	0.046	4.069	0.000***	0.261	3.833
	Distance to XXL city	0.001	0.000	0.131	18.278	0.000***	0.644	1.552
	Age	-0.011	0.001	-0.109	-18.563	0.000***	0.969	1.032
	Education (Dummy; ref: University Degree)	0.398	0.026	0.089	15.406	0.000***	0.985	1.015
	Gender (Dummy; ref: Male)	0.020	0.022	0.005	0.886	0.375	0.997	1.003
	Divorced (Dummy; ref: Divorced)	-0.123	0.031	-0.023	-3.913	0.000***	0.974	1.027
2	(Constant)	8.107	0.103		78.485	0.000***		
	Distance to at least L city	0.000	0.000	0.020	1.560	0.119	0.179	5.586
	Distance to at least XL city	0.000	0.000	-0.010	-0.754	0.451	0.168	5.952

	Distance to XXL city	0.000	0.000	0.022	1.740	0.082	0.186	5.379
	Age	-0.008	0.001	-0.082	-14.867	0.000***	0.953	1.049
	Education (Dummy; ref: University Degree)	0.303	0.025	0.068	12.325	0.000***	0.954	1.048
	Gender (Dummy; ref: Male)	-0.036	0.021	-0.009	-1.737	0.082*	0.992	1.008
	Divorced (Dummy; ref: Divorced)	-0.255	0.030	-0.048	-8.589	0.000***	0.953	1.049
	Austria	0.123	0.098	0.018	1.255	0.209	0.140	7.150
	Belgium	0.032	0.103	0.004	0.315	0.753	0.176	5.695
	Bulgaria	-2.167	0.098	-0.301	-22.222	0.000***	0.159	6.270
	Switzerland	0.428	0.098	0.050	4.353	0.000***	0.220	4.551
	Czechia	-0.700	0.099	-0.101	-7.047	0.000***	0.142	7.022
	Denmark	0.596	0.093	0.071	6.417	0.000***	0.240	4.166
	Spain	-0.100	0.091	-0.012	-1.093	0.274	0.244	4.099
	France	-0.480	0.091	-0.064	-5.302	0.000***	0.200	4.993
	Croatia	-0.191	0.098	-0.015	-1.940	0.052*	0.508	1.970
	Hungary	-1.279	0.101	-0.135	-12.652	0.000***	0.256	3.908
	Ireland	-0.116	0.074	-0.016	-1.567	0.117	0.279	3.582
	Netherlands	0.235	0.095	0.029	2.477	0.013**	0.218	4.595
	Poland	-0.529	0.093	-0.061	-5.663	0.000***	0.249	4.017
	Portugal	-0.345	0.081	-0.034	-4.268	0.000***	0.467	2.142
	Sweden	0.087	0.087	0.010	1.008	0.314	0.281	3.556
	Slovenia	-0.156	0.092	-0.017	-1.695	0.090*	0.289	3.456
	Slovakia	-1.093	0.102	-0.108	-10.746	0.000***	0.288	3.466

** = p < 0.1; ** = p < 0.05; *** = p < 0.01.*

Table 5: Regression Coefficients

In order to further dissect the relationship between subjective well-being and urban proximity, scatter plots (Figures 4, 5 & 6) were created for each of the three distance variables, including a fit line in similar colour scheme to Figure 3. A similar shape of this fit line is apparent for each of the scatterplots: starting close to the urban centre, subjective well-being decreases as the distance from the urban centre increases. Until around 150 km from each urban centre, after which subjective well-being starts increasing relatively linearly. This is most likely due to the fact that the largest distances included in this model were measured in Sweden and Norway. These two Scandinavian countries are known to have consistent high ranks of subjective well-

being in the aforementioned World Happiness Report (Helliwell et al., 2019, 2020, 2021). This also explains the peak around 570 kilometres in Figures 4 & 5, where Sweden's most northern region is closest to the XL city of Helsinki.

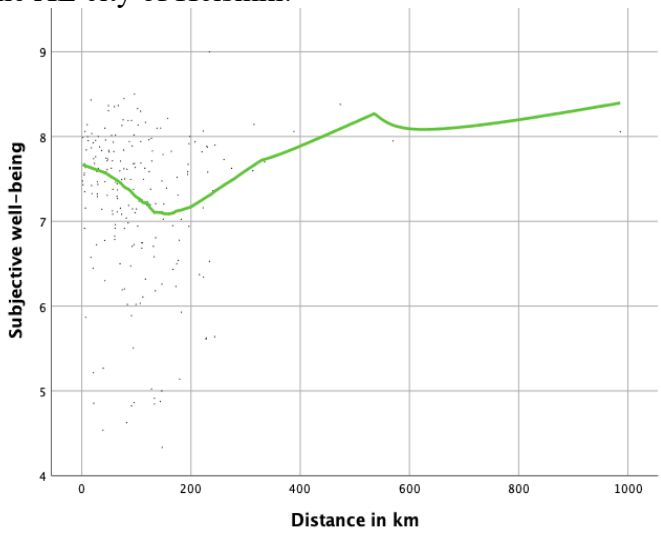

Figure 4: Scatter plot of Subjective well-being by proximity to at least an L city

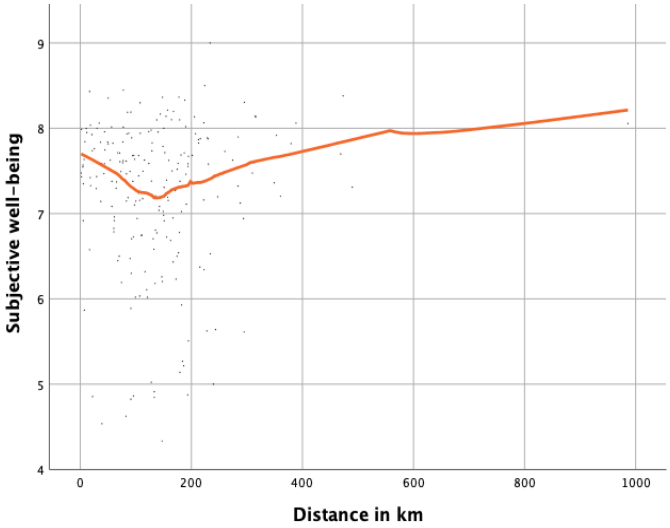

Figure 5: Scatter plot of Subjective well-being by proximity to at least an XL city

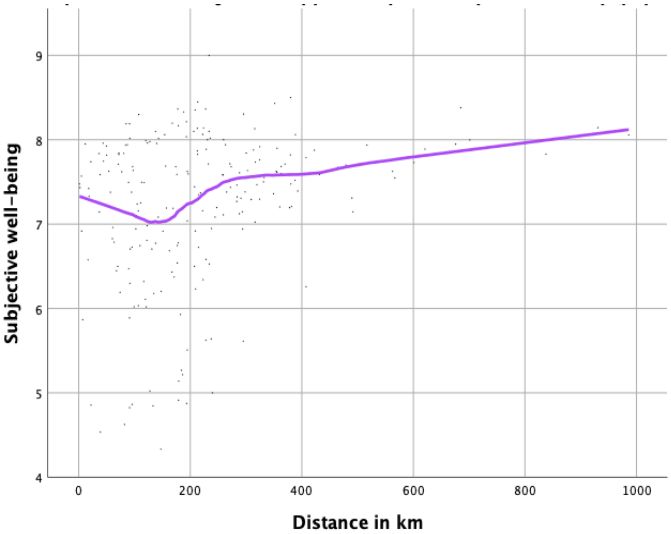

Figure 6: Scatter plot of Subjective well-being by proximity to an XXL city

Given that the mean distances to urban regions are 98.4 for Distance to at least L city 130.77 for Distance to at least XL city, and their respective standard deviations are 105.84 and 115.38, the fit lines depicted in Figures 4 and 5 are heavily influenced by these Scandinavian countries where the largest distances where measured. The same goes for Figure 6, where the mean distance is 229.30 with a standard deviation of 181.47 but to a lesser extent. Therefore, when focussing on the smaller distances, the first hypothesis mentioned in the theoretical framework can be confirmed, subjective well-being is influenced negatively as distance towards an urban centre increases.
Shifting the focus like this ironically undermines the second hypothesis that no large national differences would be apparent. Therefore, a second block was added to the model (* = $p < 0.1$; ** = $p < 0.05$; *** = $p < 0.01$.
Table 5). In this block all countries included in the analysis were added as dummy variables, with the exception of reference category Norway. This however only shows that the country someone lives in, in relation to the reference country, is a greater determinant of subjective well-being than their proximity towards a large urban area, as these three variables are insignificant in the second model. This is also apparent in Figure 7, where little difference is found within national borders, but countries themselves contrast more evidently.

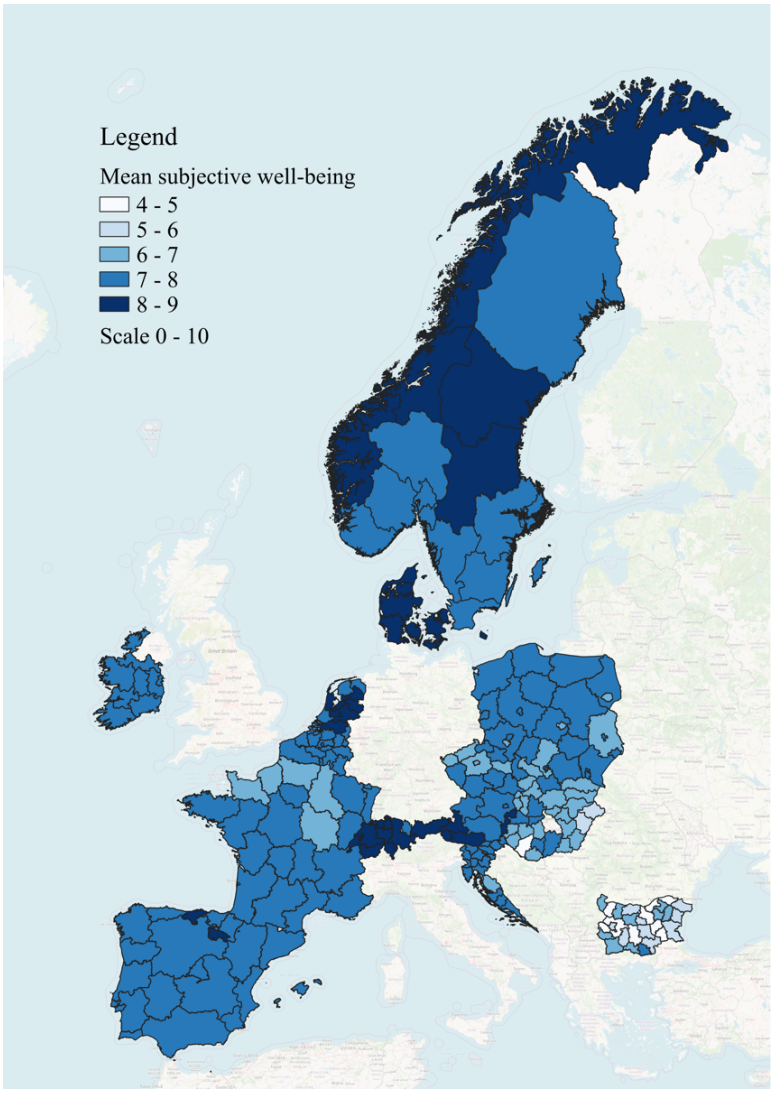

Figure 7: Mean subjective well-being per region

Running the regression model (1) for each of the countries on its own had similar results, a summary of which can be found in Table 6. In order to avoid multicollinearity, only the Distance to at least XL city of the distance variables was used.

Country	N	R^2	p-value Total model	Unstandardized Coefficient B Distance to at least XL city	p-value of Distance to at least XL city
Austria (AT)	2480	0.037	0.000***	0.002	0.000***
Belgium (BE)	1763	0.010	0.004***	0.000	0.737
Bulgaria (BG)	2181	0.108	0.000***	0.000	0.577
Switzerland (CH)	1524	0.005	0.223	0.000	0.763
Czechia (CZ)	2371	0.042	0.000***	0.002	0.007***
Denmark (DK)	1564	0.006	0.076	-0.001	0.146
Spain (ES)	1593	0.024	0.000***	0.000	0.333
France (FR)	2001	0.027	0.000***	0.000	0.861
Croatia (HR)	639	0.039	0.000***	0.005	0.002***
Hungary (HU)	1222	0.076	0.000***	-0.005	0.000***
Ireland (IE)	2170	0.016	0.000***	-0.001	0.118
Netherlands (NL)	1663	0.007	0.050**	0.001	0.270
Norway (NO)	1371	0.013	0.002***	0.000	0.139
Poland (PL)	1482	0.048	0.000***	0.000	0.991
Portugal (PT)	1042	0.053	0.000***	-0.000	0.503
Sweden (SE)	1531	0.013	0.002***	0.000	0.087*
Slovenia (SI)	1314	0.064	0.000***	0.000	0.740
Slovakia (SK)	1064	0.078	0.000***	-0.001	0.515

** = p < 0.1; ** = p < 0.05; *** = p < 0.01.*

Table 6: Summary of regression models per country

Table 6 shows that, with the exception of Denmark and Switzerland, each regression model as a whole was able to reliably predict subjective well-being given the independent variables Distance to at least XL city, Age, Education, Gender and Divorced. However, only for Austria, Czechia, Croatia and Hungary the variable of Distance to at least XL city is significantly related to subjective well-being. For Hungary, this linear relationship is negative, with each increase of one kilometre in distance a decrease of 0.005 subjective well-being is expected. Whereas for the other three countries, a positive linear relationship is found. However, these Unstandardized Coefficients for B are, like in the model including all countries, very close to 0. Stressing the importance of other contextual and compositional factors in determining subjective well-being, but regarding a relationship between subjective well-being and urban proximity, no major differences can be found. The differences influencing the fit lines of figures 4, 5 and 6 predominantly constitute of the longer distances found in overall happier countries, to assume a long distance (over 300 kilometres) from a city positively influences subjective well-being would be wrong, as these distances cannot be measured in most countries.

Conclusion

As the concept of the urban paradox (Morrison & Weckroth, 2018) has established, there is a negative relationship between subjective well-being and residence in the largest metropolitan

centre of countries with developed economies. One of the reasons for this is the possibility of borrowing urban benefits when residing near these large urban regions (Meijers & Burger, 2017). This research builds upon these findings and shows that subjective well-being decreases in general as distance to these cities increases. The multiple linear regression model used to research this showed a small but significant negative linear relationship between subjective well-being and distance to cities with at least 250 000 inhabitants and a positive linear relationship between subjective well-being and distance to cities with at least 500 000 inhabitants. As this result was somewhat inconclusive, a closer look at the fit lines of the scatter plot for each of the three distance variables relating to subjective well-being showed a similar shape. A decreasing subjective well-being as distance to an urban area increases until around 150 kilometres, after which subjective well-being increases again. This is caused by the highest distances measured in this research were found in countries with relatively high subjective well-being. This was confirmed by the addition of a second model in the regression model, adding all countries included in this research as dummy variables and using the high subjective well-being, high distance country of Norway as reference category. Running the regression for each of the countries on its own surprisingly showed little conclusive national differences, where in only four of the eighteen countries, a linear relationship between subjective well-being and proximity to a large metropolitan region is apparent. Strikingly, in only one of these countries (Hungary) the relationship was negative. The analysis further took into account other compositional determents of subjective well-being. These include age (Blanchflower & Oswald, 2006), education (Morrison, 2014), and data on divorce and gender. These control variables, with the exception of gender, also proved to be of significance in determining subjective well-being.

A possible explanation for the inconclusive results per country could be the overgeneralization of the data. In this research, each respondent from the same region was given the same distance values. Whereas more precise and individual geographical data would be better suited for research like this. It would also allow for Geographically Weighted Regression, a spatial regression technique that can include more spatial context than distance. Similarly, the distances measured do not take into consideration water bodies, other obstacles or roads but are linear. In some cases, this poorly reflects the reachability of a city to borrow its urban benefits. Future research could address this by looking into travel time or travel distance to a city.

In spite of its limitations, this analysis tries to offer some additional insight into the urban paradox and how the concept of borrowing urban benefits plays a role in this. However, more (precise) research would help us to establish a greater degree of understanding on subjective well-being in a spatial context.

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