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Livability and Subjective Well-Being Across European Cities

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Abstract This study documents for the first time the correlation between livability and subjective well-being (SWB) across European cities. Livability is measured with the popular Mercer Quality of Living Survey and correlates considerably with SWB, measured as place and life satisfactions. There are outliers, for instance: the "unlivable" but "happy" Belfast (fool's paradise) and the "livable," but "unhappy" Paris (fool's hell). In addition, we find geographic patterns: while the Mercer index ranks higher Western cities, subjective well-being is higher in Northern cities. Smaller cities score higher on both livability and SWB, confirming thus the urban sociological theory of urban malaise while contradicting urban economic theory of city triumph.

Keywords Satisfaction · Happiness · Subjective well-being · Quality of life · Urban quality of life · Cities · City rankings · Livability · Best places to live · Mercer · Economic theory · Utility

Livability refers to the quality of life, standard of living, or general well-being of a population in a specific region, area, or city. It is the sum of factors that add

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up to a community's quality of life (economic prosperity, social equity and stability, educational opportunities, recreation and cultural possibilities, etc.) According to the Mercer Quality of Living Survey,[1] the cities with the highest levels of livability are predominantly European (Okulicz-Kozaryn 2013; Mercer 1999). Vienna, Zurich, Geneva, and Copenhagen, among others, rank as the most livable cities. This paper aims to explore for the first time whether urban livability is correlated to happiness in Europe. Does living in a city with high levels of livability increase happiness? Or is individual happiness independent from the livability of a city? Similarly, is the relationship between livability and happiness consistent throughout Europe or are there regional differences?

To address these questions, it is important to recognize that Europe is largely divided into two main areas: East and West. These regions are distinct in how their institutions are organized and on the characteristics of their residents. The East tends to be more traditional and some might even consider it "backward," while poorly governed and with low opportunities for economic advance, yet residents tend to be cheerful and spontaneous. The East is a region experiencing a new post-communist era, and is less advanced in terms of democracy and capitalism, although some argue that these differences are disappearing (Hudabiunigg 2004). Unlike the East, the West has institutions that are well governed and organized governments are more progressive and well-endowed, providing residents with opportunities for financial success. Yet, people in the West are known to be "grim and stiff." This duality seems to be applicable to the South and North regions of Europe as well, where Eastern qualities can be also applied to the South, and Western qualities to the North.

These contrasting differences should be of concern to policymakers and European citizens alike, given that one of the founding principles of the European Union is to promote economic, social and territorial cohesion among member states (Union 2004). In addition, with ever increasing urbanization[2] and the free movement of EU citizens within the European Union, understanding the relationship between livability and subjective well-being may help explain residency decisions, and provide measurement to promote territorial cohesion among member states.

The Social Indicators Literature: Objective and Subjective

According to the Webster dictionary, livability is defined as "suitability for human living." Some scholars, define livability as (objective) quality of life, welfare, 'level of living,' or habitability (Veenhoven 2000). Another definition for livability is quality of place (Burton 2014) and its synonyms: environmental quality or urban quality, defined as the "the physical characteristics of community, the way it is planned,

[1]The Mercer Survey, also referred to as the Mercer Index, evaluates cities based on 39 factors including political, economic, environmental, personal safety, health, education, transportation, and other public service factors. We discuss the index later in depth.

[2]Europe, as the rest of the world, is urbanizing: in 1950 about half of Europeans lived in cities, now it is about 74% and the urban proportion will increase by another 10 percentage points to about 84% by 2050 (http://esa.un.org/unup/).

designed, developed, and maintained" (Burton 2014, p. 5312). The Mercer Index used in our analysis, mostly measures material standards or levels. Thus, livability is tangible and objective. Perhaps the term 'standard of living,' or 'level of living,' are actually the best terms to describe how livability is measured. A shortcoming of the current measurement of livability is that it fails to account for intangible qualities of place such as vibrancy, authenticity, and distinctiveness. Nevertheless, it is much more comprehensive than traditional economic approaches that tend to equate development, or progress, with income or consumption.

Subjective well-being (SWB) is one of the most comprehensive measurements available. Diener and Lucas (quoted in Steel et al. 2008, p.142) define it as people's evaluations of their lives, which include "both cognitive judgments of one's life satisfaction in addition to affective evaluations of mood and emotions," which is virtually the same as Veenhoven's (2008, p. 2) definition: "overall judgment of life that draws on two sources of information: cognitive comparison with standards of the good life (contentment) and affective information from how one feels most of the time (hedonic level of affect)." In this paper, we use these overall SWB definitions when referring to subjective well-being, and we use the terms "happiness" and "life satisfaction" interchangeably.[3]

The relationship between livability and subjective well-being should be positive: if livability is high, human needs are satisfied and as a result happiness follows (Diener et al. 1993; Veenhoven 1991; Veenhoven and Ehrhardt 1995). Figure 1 visualizes this relationship: Livability is illustrated as Florida's (2008) pyramid of place in Panel a) (also see Burton 2014) and the pyramid's bottom is similar to Maslow's pyramid of a person's needs (Maslow [1954] 1987) in Panel b). The foundation of both pyramids are basic needs. The top of Maslow's pyramid is made of psychological and self-fulfillment needs, whereas Florida places higher dimensions of livability at the top. The Mercer Index is relatively similar to Florida (2008)'s pyramid of place shown in panel a) in Fig. 1, especially its bottom.

As shown in Panel c), subjective well-being is a function of basic needs first (the foundation of the pyramids), but once they are satisfied, SWB depends on the higher dimensions prescribed in both pyramids. Panel c) is also a reformulation of the well-being and income graph from Inglehart (1997), (also see discussion in Inglehart 1997, p. 1849), and it illustrates the "affluence paradox" (Pacione 2003)—the more income, economic development or affluence, the less these matter for SWB. At higher level of economic development, what matters for SWB are the characteristics described at the higher dimensions of both pyramids. This phenomenon is similar to the diminishing marginal returns from income on subjective well-being observed at country, region, and person levels (Okulicz-Kozaryn 2012). Note that the definitions used in Fig. 1 are not definitive, and were used for the purpose of illustration

[3]Some scholars make a distinction between happiness and life satisfaction—life satisfaction refers to cognition and happiness refers to affect. Life satisfaction is a cognitive aspect of happiness (Dorahy et al. 1998) We cannot differentiate between the two as we have only one measurement, hence, we mostly measure 'life satisfaction, not 'happiness.' But as described above, there is an overlap between the two. In addition, we will use a place satisfaction measure.

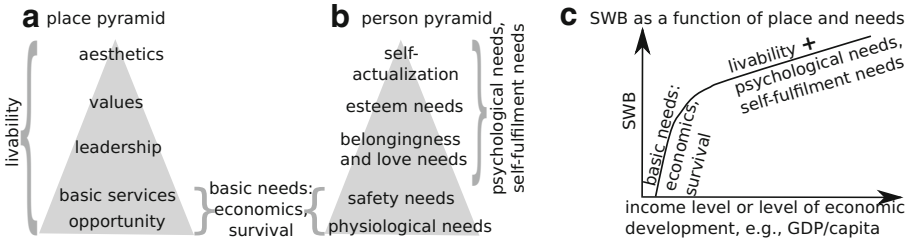

Fig. 1 **a** Livability as place pyramid; **b** Maslow's hierarchy of needs; **c** SWB as a function of (**a**) and (**b**)

only. Livability can be defined in a much broader way than what is illustrated in Florida (2008)'s pyramid—for instance, it can include welfare provision or broadly understood income redistribution (Okulicz-Kozaryn et al. 2014). The Mercer Index, used in this study, captures most of the characteristics in the bottom of the pyramids (basic needs: economics and survival) and to a lesser degree some of the aspects in the higher dimensions. There has been debate about whether SWB would increase linearly with income in Panel c), and some scholars even transform the x axis into a log scale and use cross-section as opposed to time series when illustrating this relationship (e.g., Stevenson and Wolfers 2013), however, the literature has shown that usually in the long term SWB has nil relationship with income (Easterlin et al. 2010). There are cases, however, when income and SWB go hand in hand over time (Veenhoven and Vergunst 2013).

There is an extensive literature on the livability-SWB nexus (Veenhoven 2000; Cummins 2000; Diener and Suh 1997; Schneider 2005; Pacione 2003). From these, we've learned that objective and subjective indicators provide different perspectives, each has strengths and weaknesses and both should be used as complements, and most importantly, it is critical to use subjective indicators as they add greatly to economic measures such as income.

There are several major happiness theories that can explain the relationship between livability and SWB. One of the main theories is Veenhoven's Livability Theory (Veenhoven and Ehrhardt 1995; Veenhoven 2000, 2014a). Livability depends on ecology, but also on some fundamental human and social needs such as those at the bottom of Maslow's pyramid of needs (Maslow [1954] 1987). In other words, there are some universal human needs that need to be satisfied (Veenhoven and Ehrhardt 1995).

Another theory proposed by Michalos links livability and SWB (Michalos 2014), refer to Table 1. Michalos' classification is somewhat similar to Veenhoven's four qualities of life (Veenhoven 2000) discussed later in Table 2. Concurrently, there is also the overall Quality Of Life (QOL) theory subsuming objective with subjective indicators (Veenhoven 2000; Michalos 2014; Giannias and Sfakianaki 2014; Burckhardt et al. 2003). Quality of life can be defined as "a global measure based on an aggregation of well-being across several life domains (e.g., recreational, social activities, finances), usually assessed using a combination of objective and subjective indicators" (Steel et al. 2008). This is very similar to the QOLS scale (Burckhardt

Table 1 Michalos' two variable theory: a fool's paradise and a fool's hell (Michalos 2014)

	lo livability	hi livability
lo SWB	Real hell [deprivation, unhappy poor]	Fool's hell [dissonance, unhappy rich]
hi SWB	Fool's paradise [adaptation, happy poor]	Real paradise [well-being, happy rich]

Cummins' classification is shown in the square brackets (Sirgy 2002, p. 61)

et al. 2003). However, such aggregation may not be the best idea—there is a conceptual and empirical difference between the two—it is better to explore the relationship between objective and subjective indices instead.

There is a handful of empirical studies linking objective with subjective indicators. Senlier et al. (2009) and Wkeziak-Bialowolska (2016) find a significant link between most domain perceptions, or satisfactions, and overall place satisfaction. Balducci and Checchi (2009) on the other hand, find a significant link only between some domain perceptions and overall happiness for specific cities separately and after controlling for person level characteristics. Liao (2009) uses both objective and subjective measures and finds that in most domains the correlation between objective and subjective is insignificant. In general, livability and SWB have been found to be poorly or moderately correlated (Schneider 2005; von Wirth et al. 2015; Cummins 2000; Okulicz-Kozaryn 2013).

Oswald and Wu (2009) mostly contradicts the literature by finding moderately high correlation (.6) between subjective and objective indicators. Several explanations for this incongruity are possible: a large representative sample of state level data and adjustment of life satisfaction measure with person level predictors. Perhaps the key is their usage of a comprehensive SWB measure, life satisfaction, and comprehensive index of QOL containing multiple domains. Our study will also use the life satisfaction measure of SWB and the comprehensive QOL Mercer Index finding concurrent results.

We know how livability relates to place satisfaction (Okulicz-Kozaryn 2013). But, what is the relationship of livability with overall life satisfaction? This is the first study linking overall livability, defined as objective quality of life or standard of living, with subjective well-being (SWB) measured as life satisfaction across European cities. Before turning to data analysis, we add one more angle to our study—that of urbanicity or size of place.

Table 2 Veenhoven's four qualities of life (Veenhoven 2000)

	Outer qualities	Inner qualities
Life chances	Livability of environment [Mercer rank, pop size]	Person's life-ability [N/A]
Life results	Utility of life [NA]	Appreciation of life [place, life satisfaction]

The measures used in this study are in brackets. Note that place also affects life-ability to some degree, for instance, urban living is unhealthy to the human brain (Lederbogen et al. 2011)

Urban Economic v Sociological Literatures: Size of a Place as Livability

With respect to cities, economists and sociologists are less focused on the differences and relationships between objective and subjective measures. One of their interests however, is urbanicity[4]—the degree to which a place is urban, often measured as population size. These urban economic and sociological literatures are largely separate from the social indicators literature, and both mainstream economists[5] and sociologists (Veenhoven 2014b) still tend to dismiss SWB. It is important to connect the literatures, because economic theory argues in favor of large cities, while sociological theory is more ambivalent, but tends to argue in favor of smaller places.

Classic sociologists point to the problems of city life: over stimulation, withdrawal, vice, impersonality, and shallowness (Park et al. [1925] 1984; Simmel 1903; Tönnies [1887] 2002; Wirth 1938). Popular urbanists such as Florida, Jacobs, and Zukin are more ambivalent (Zukin 2009; Florida 2014, 2016a, b, c; Jacobs [1961] 1993)—surely they appreciate cities—yet, they are also critical, and value the small-town feel (e.g., see famous appreciation of small-town feel of Greenwich Village by Jacobs ([1961] 1993)). Economists invariably point to the economic benefits that emerge in cities such as labor specialization, productivity, agglomeration economies, economies of scale, invention and creativity (Florida 2008; Glaeser 2011b; O'Sullivan 2009). According to the Central Place Theory (e.g., O'Sullivan 2009) consumption in large scale can only take place in the largest cities: large museums, opera houses, symphonies, etc.

Thus, we propose to explicitly test the size of a place as a measure of livability. We are not aware of any other research where livability is explicitly defined as the size of a place, although some studies have implicitly suggested it, particularly those using economic theory (e.g. Glaeser 2011a, b).[6] In general, economists main goal is to maximize utility or welfare,[7] measured as income or consumption (Autor 2010). Geographically, the greatest income or consumption per capita is always found in the

[4]There has been many studies linking urbanity to SWB, for instance, see the World Database of Happiness (http://worlddatabaseofhappiness.eur.nl), subject section Eb02 'Urbanity'.

[5]There are many "maverick economists" studying the so called, "economics of happiness." Some such as Richard Easterlin and Andrew Oswald have significantly contributed to the social indicators literature. Notwithstanding, there are a few skeptics who do SWB research, but sneer it at the same time (e.g., Angus Deaton (e.g., Deaton 2013) and Ed Glaeser (Glaeser et al. (2014, 2016)). Many, if not the vast majority of economists do not consider SWB, social indicators or any social science outside of economics as worthwhile (Economist 2014, 2016; Naim 2016; Fourcade et al. 2015).

[6]There are also studies by economists using "hedonic pricing" and "compensating differentials," see for instance Oswald and Wu (2009), Giannias and Sfakianaki (2014), Glaeser et al. (2016), and Albouy (2008). We do not dwell into this economic literature as it is based on revealed preferences and rationality assumption—and we know that humans are not rational (Shiller 2015; Zafirovski 2014; Akerlof and Shiller 2010; Ariely 2009; Kahneman 1994; Sen 1977). There are also economists using broader measures such as crime and pollution—for review see Lambiri et al. (2007).

[7]Veenhoven (2000, p. 6) also confirms that "economists sometimes use the term 'welfare' for livability of environment.

largest cities, hence, the bigger the city, the more utility or welfare. Thus indirectly, size of place refers to economist's notion of livability:

$$livability \approx size\ of\ a\ place \tag{1}$$

If defining livability as size of place seems far-fetched, see the conceptualization by sociologist Veenhoven (2000) in Table 2, where livability of environment is defined as the intersection of outer qualities (place, environment) and life chances. Clearly, the city epitomizes the apex of life chances. Nowhere else there is so much variety and opportunity (Tönnies [1887] 2002; Milgram 1970; Fischer 1995; Glaeser 2011b; O'Sullivan 2009; Campbell 1981).

Although non-intuitive, there is support in the economic literature for the $livability \approx size\ of\ a\ place$ equation. As one economist explains, "more populous cities offer a higher QOL that is implied by wages and costs alone: if two cities offer the same wages and costs, the more populated city is deemed the one more amenable to the average individual" (Albouy 2008, p. 20). Of course, this is not the only measurement economists use, as shown in (Albouy 2008; Lambiri et al. 2007; Myers 1988), nor would they use it explicitly. However, a careful review of the most recent economic literature on the topic (Glaeser et al. 2014, 2016; Glaeser 2011a, b, 2014; Albouy 2008) reveals that this definition is implicit. Albouy (2008) provides a specific treatment of QOL and size of a place, and concludes that the bigger the place, the higher the quality of life (see Table 1 in Albouy 2008). In some ways, the economic approach to livability seems to be similar to how development and progress used to be measured solely as income (e.g., per capita gross domestic product). It was not until recently that some progressive economists acknowledge this shortcoming (e.g., Stiglitz et al. 2009), while non-economists knew it for decades (e.g., Campbell et al. 1976).

Another popular measure of QOL among economists is $\frac{cost\ of\ living}{wage}$ (Albouy 2008), which is a reasonably good proxy for size of a place—cost rises much faster than wage with population size (Okulicz-Kozaryn 2015b). Similarly, economists like Glaeser et al. (2016) for example, tend to assume that city growth is a consequence of people's rational preference for the city, and hence, they must be happy there. Therefore, city growth is a result of utility or SWB maximization. Here, for simplicity, we just focus on city size, not city growth. There are also some dissenters among economists arguing that there is higher utility in smaller places, as reviewed, for instance, in Albouy (2008) or Pines (1972).

In general, economists would predict that more money means more SWB (Autor 2010), and since wages and consumption are greatest in the largest cities, the argument follows that this will yield the highest happiness levels. Alternatively, an urban economist would predict that SWB will be constant across space: the more money, the more utility, but "urban dis-utilities" like commute distance and time have to be compensated by higher wages, and net utility is constant. According to the axiom of spatial equilibrium—one of the most important founding principles of urban economics—in equilibrium, individuals cannot improve their overall utility levels via migration (Glaeser et al. 2016), making SWB constant across cities. Our results contradict economic theory and indicate the opposite: larger cities do not have the

highest SWB levels, nor is SWB constant across cities. We find that the highest levels of SWB are found in the smallest places.

Data

We use the 2015 Mercer Index, and complement the analysis by using the 2012 data as a robustness check in the Appendix. The SWB data come from the Eurostat database at http://ec.europa.eu/eurostat/web/cities/data/database (urb_percep database). The Eurostat data are city-level aggregates from the Flash Eurobarometer Survey 419 (Quality of Life in European Cities 2015) and the Flash Eurobarometer Survey 366 (Quality of Life in European Cities 2012).[8] The Flash Eurobarometer Surveys interviewed European urbanites aged 15+ via telephone in their mother tongue on behalf of the European Commission. The basic sample design applied in all countries is multi-stage random (probability). In each household, the respondent was drawn at random following the "last birthday rule" (for more information see https://doi.org/10.4232/1.12516). SWB is measured using two variables:

LIFE SATISFACTION measured with "Q3.3 On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with ...? - The life you lead."

PLACE SATISFACTION measured with "Q3.4 On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with ...? - The place where you live."

Eurostat provides the percentage of respondents in each category as separate variables. We created one variable by using the following transformation:

$$\begin{aligned} variable\ used\ here = {} & ('strongly/very\ YES' * 1) + ('somewhat/rather\ YES' * .5) \\ & + ('somewhat/rather\ NO' * -.5) + ('strongly/very\ NO' * -1) \end{aligned}$$

The new variable ranges between a theoretical -100 where everybody "strongly/very" disagrees to +100 where everybody "strongly/very" agrees. Okulicz-Kozaryn (2013) used a synthetic index, $\frac{('strongly/very YES' + 'somewhat/rather YES')}{('strongly/very NO' + 'somewhat/rather NO')}$ which is very similar to our variable—they both correlate at about .95, and the transformation we use is slightly better as it uses ordinal scale information as opposed to treating 'strongly/very' and 'somewhat/rather' as the same. Livability is also measured with two variables: the Mercer Index Ranking and population size.

The MERCER is a city ranking survey based on the Mercer Index and can be downloaded from https://www.imercer.com/uploads/GM/qol2015/h5478qol2015/index.html. The Mercer is probably the most popular survey used to rank cities in terms of their livability or standard of living. Other "best places to live" rankings appear to follow the Mercer. For instance, the Economist and Forbes base their rankings primarily on data from the Mercer ranking (e.g., http://www.livablecities.org/blog/value-rankings-and-meaning-livability). Kotkin (2011) claims

[8] We were unable to find a direct statement per the source of the 2015 Data in the Eurostat Metadata. The 2012 Data is directly referenced in Eurostat Metadata to "Quality of life in cities - Perception survey in 79 European cities - European Commission, Flash Eurobarometer 366, October 2013".

that the Economist ranking is ''remarkably similar'' to the Mercer Ranking. The ranking calculates livability based on 39 factors, grouped in 10 different categories. The Mercer survey questioned expatriates on the importance of each of the 39 issues. The weights assigned to each category are as follows (most heavily weighted items are in bold):[9]

23 **Political and social environment** (political stability, crime, law enforcement, etc)
4 Economic environment (currency exchange regulations, banking services, etc)
6 Socio-cultural environment (censorship, limitations on personal freedom, etc)
19 **Health and sanitation** (medical supplies and services, infectious diseases, sewage, waste disposal, air pollution, etc)
3 Schools and education (standard and availability of international schools, etc)
13 **Public services and transportation** (electricity, water, public transport, traffic congestion, etc)
9 **Recreation** (restaurants, theaters, cinemas, sports and leisure, etc)
11 **Consumer goods** (availability of food/daily consumption items, cars, etc)
5 Housing (housing, household appliances, furniture, maintenance services, etc)
6 Natural environment (climate, record of natural disasters)

The POPULATION size of a city is the second measurement of livability. As argued earlier, it is a problematic measure, but it is derived from economic theory, which implicitly argues that the "larger the place, the better." Population size is a good proxy for opportunity, and livability can be defined as an intersection of life chances and outer qualities (Veenhoven 2000). In general, urbanicity can be measured as population size, density, and heterogeneity (Wirth 1938). For simplicity, we just use population size as a measure. Furthermore, there is a large variability in population size. In the sample used here, some places are small towns of less than 100k people, and some places are large cities with a million or more people. City populations were still largely unavailable for 2015, hence, we extrapolate population from previous years using linear interpolation with Stata command `ipolate` with the `epolate` option.

Results

Table 3 shows the correlations. We begin by examining how each of the two variables measuring SWB and livability correlate with each other. As expected, the two measures of SWB, PLACE and LIFE SATISFACTIONS correlate strongly at .75.

On the other hand, the MERCER ranking actually correlates with POPULATION (.24) in the opposite direction to what economic theory would argue: the larger the place, the lower the Mercer ranking.[10] Second, we turn to the correlations of livability

[9] We obtained the weights by contacting Mercer in 2011. We have contacted them again to see if there was any change and were told that it has not changed. Morais et al. (2013) reports the same weights. A full list containing the 39 factors can be found in Okulicz-Kozaryn (2013).

[10] Higher value in rankings denotes lower rank, of course.

Table 3 Pairwise correlations

Variables	Mercer	Population	Place satisfaction	Life satisfaction
Mercer	1.00			
Population	0.24	1.00		
Place satisfaction	−0.57*	−0.38*	1.00	
Life satisfaction	−0.63*	−0.15	0.75*	1.00

*$p < .05$

measures with SWB measures. As predicted by sociological theory, and opposite to economic theory predictions, POPULATION correlates negatively with PLACE SATISFACTION at −.38 and with LIFE SATISFACTION at −.15. The MERCER, on the other hand, indicates that the higher the place in livability ranking, the higher the SWB. The MERCER ranking correlates quite strongly with PLACE and LIFE SATISFACTIONS at about .6 indicating a considerable overlap between livability and SWB. Interestingly, (Oswald and Wu 2009) also found a correlation of .6 between SWB and objective measures of quality of life across US states, which they argue to be very high:

> A correlation coefficient of 0.6 is unusual by the standards of behavioral science. It is high by the cut-offs suggested by Cohen's rules-of-thumb (which argued that in human data an r value over 0.5 should be seen as a large association, and 0.3 a medium one). An r = 0.6 is the same degree of correlation, for example, as has been found for one's own life-satisfaction readings taken 2 weeks apart.

While the correlation found in our study is almost identical with Oswald and Wu (2009)'s results, it is considerably higher than the .36 correlation found in Okulicz-Kozaryn (2013). Several explanations for this discrepancy are possible. Although the Mercer Survey has not changed measurement and measures livability in the same way, it uses a bigger and more representative sample. Likewise, the Eurobarometer measurement of SWB may have improved. Okulicz-Kozaryn (2013) used one of the first data collections on the European urban satisfactions survey. Our study uses a slightly different measurement from Okulicz-Kozaryn (2013) who used a synthetic index to measure place satisfaction. Furthermore, Okulicz-Kozaryn (2013) used the Mercer Index, and our study, like Oswald and Wu (2009)'s, uses the ranking (although both correlate at about .95). One difference that helps explain the discrepancy is that Okulicz-Kozaryn (2013) used survey means over the years of 2004, 2006 and 2009. Using single year, as opposed to multi-year averages would increase correlations by about .05 to 0.1.

Hence, the .36 correlation found in Okulicz-Kozaryn (2013) would predictably go up to as high as .46, which is not very different from the .57 correlation found here. Furthermore, the scatterplot linking place satisfaction with the Mercer index in Okulicz-Kozaryn (2013) is similar to the one reported here.

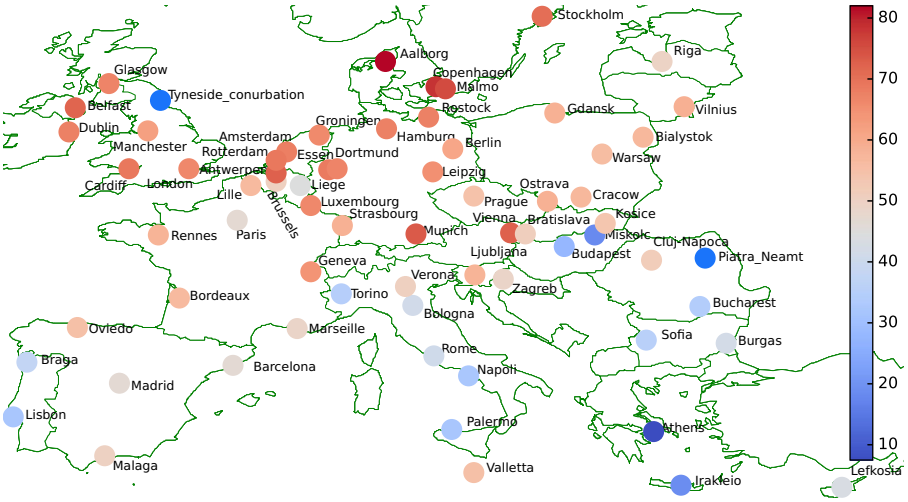

Fig. 2 Life satisfaction ranges from low (blue) to high (red)

Next, we turn to visual explorations. LIFE SATISFACTION is shown in the map in Fig. 2.

Cities in the North have higher levels of happiness than cities in the South region (including France). This result is concurrent with Okulicz-Kozaryn (2011)'s findings across European regions in 1996: there are clusters spanning national boundaries. The North Western part of Europe, or more specifically Germany, the Netherlands, the UK, and Scandinavia constitute a large cluster of cities with high levels of happiness.

Studies have found that being close to the coast improves SWB (White et al. 2013; Wheeler et al. 2012), however, we do not find this pattern here: cities with the lowest level (e.g., Athens) and with the highest level (e.g., Copenhagen) of subjective well-being are both coastal. Similarly, our results do not necessarily support research indicating that people prefer warmer temperature in the winter and colder temperature in the summer (Rehdanz and Maddison 2005)

Figure 3 plots SWB against the Mercer ranking. A clear pattern emerges: the Mercer ranks Western cities higher than Eastern, thence livability ranges in the East-West dimension. All Western cities are ranked at 65 or higher on the Mercer ranking, and all Eastern cities are ranked below it. Hence, objective quality of life has a clear East-West dimension, which is understandable to some degree: the post communist East still suffers from lower income and other disadvantages such as lower civic engagement and lower subjective feeling of freedom (Okulicz-Kozaryn 2008, 2015a). As the results show in Fig. 3, there is a cluster of cities which ranked high on both SWB and the MERCER circled as West, and a cluster with lower PLACE SATISFACTION and lower LIFE SATISFACTION circled as East. The West-East dimension is clearer than the North-South, where there is a little mixing, but it is still clear that

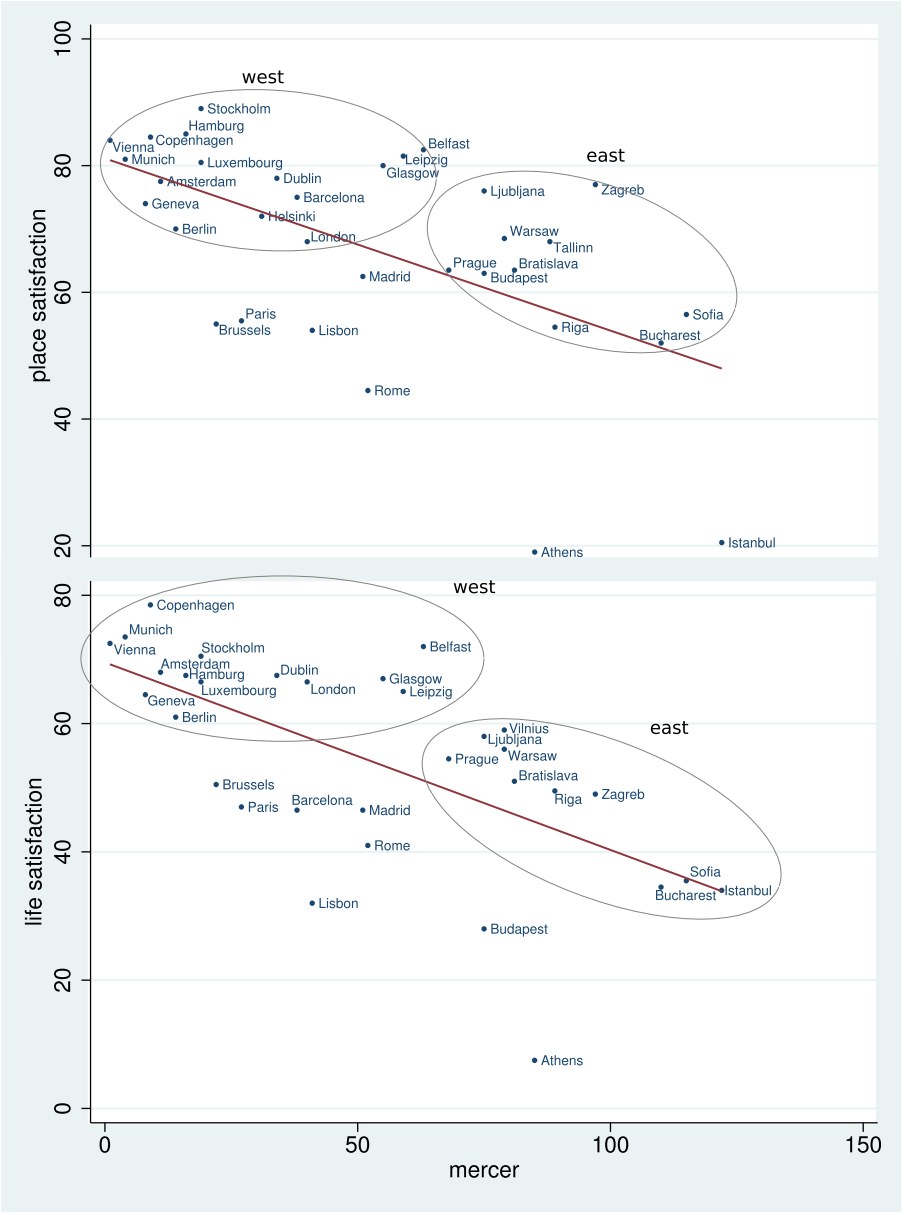

Fig. 3 SWB (place and life satisfactions) against the Mercer ranking. Linear fit shown: the higher the livability (Mercer rank), the higher the SWB. "Western" and "Eastern" clusters of cities circled

the South has considerably lower SWB than the North. In fact, if SWB is set at a low level such as 44, we can observe that all cities below this threshold are Southern: Athens, Bucharest, Budapest, Istanbul, Lisbon, Rome, Sofia, Ankara, Athens (greater

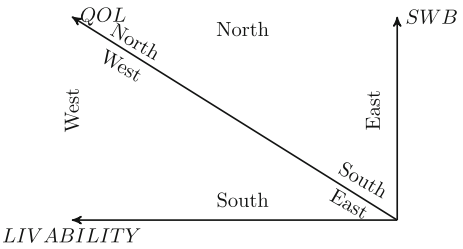

Fig. 4 Four Europes: the unlivable East and the livable West region, and the unhappy South and the happy North region. Hence, overall, in terms of QOL: a "supreme" North-West region and an "inferior" South-East region. Note: the graph is drawn in such a way as to correspond directionally with Fig. 3: Northern cities are located at the top, and Eastern cities to the left

city), Bologna, Braga, Burgas, Diyarbakir, Irakleio, Lefkosia, Lisbon (greater city), Miskolc, Napoli, Palermo, Piatra Neamt, Torino. Many of these places are omitted from the scatterplots because they are not ranked in the Mercer. They are displayed, however, in the map in Fig. 2.

Given that SWB stretches from the "unhappy" region of the South to the "happy" region of the North and livability stretches from "substandard" East to "preeminent" West, the highest ranking region on both dimensions is the North-West and the lowest ranking is in the South-East as visualized in Fig. 4.

There are some outliers: livable but unhappy, or unlivable but happy places. Outliers can be described in terms of Michalos (2014) terminology: Belfast and Ljubljana are a fool's paradise: higher SWB than expected from livability; while Paris and Athens are a fool's hell: lower SWB than expected from livability. Although, in the case of Athens, the Greek crisis might have affected the results. The cities that fall outside of the circled West and East regions, have lower, in some cases much lower, SWB than expected from the Mercer ranking (refer to Fig. 3).

In general, places ranked high on life satisfaction (top panel) are also ranked high on place satisfaction (bottom panel), but a few places do not correspond on both dimensions, for instance, Istanbulites are quite satisfied with their lives, but not so much with the place they live in.

The higher a city is ranked on the Mercer, the greater the SWB—Western cities score higher on both dimensions and South-Eastern cities score lowest on both. Outliers are instructive—in several places, people were more satisfied with their cities than expected from the Mercer: all are relatively smaller cities such as Stockholm, Glasgow, and Belfast in the North-West, Leipzig in the Central region and Ljubljana and Zagreb in the Central South. The few places where people were less satisfied than expected from the Mercer ranking were rather large cities: Brussels, Paris and Lisbon. This suggests that even though the Mercer ranks smaller places higher, it still under-ranks small places and over-ranks large cities.

Figure 5 repeats the exercise from Fig. 3, except that it now plots population on the x axis. The bigger the place, the lower the PLACE SATISFACTION ($r = -.38$) and LIFE SATISFACTION ($r = -.15$; insignificant). Scatterplots exclude cities with

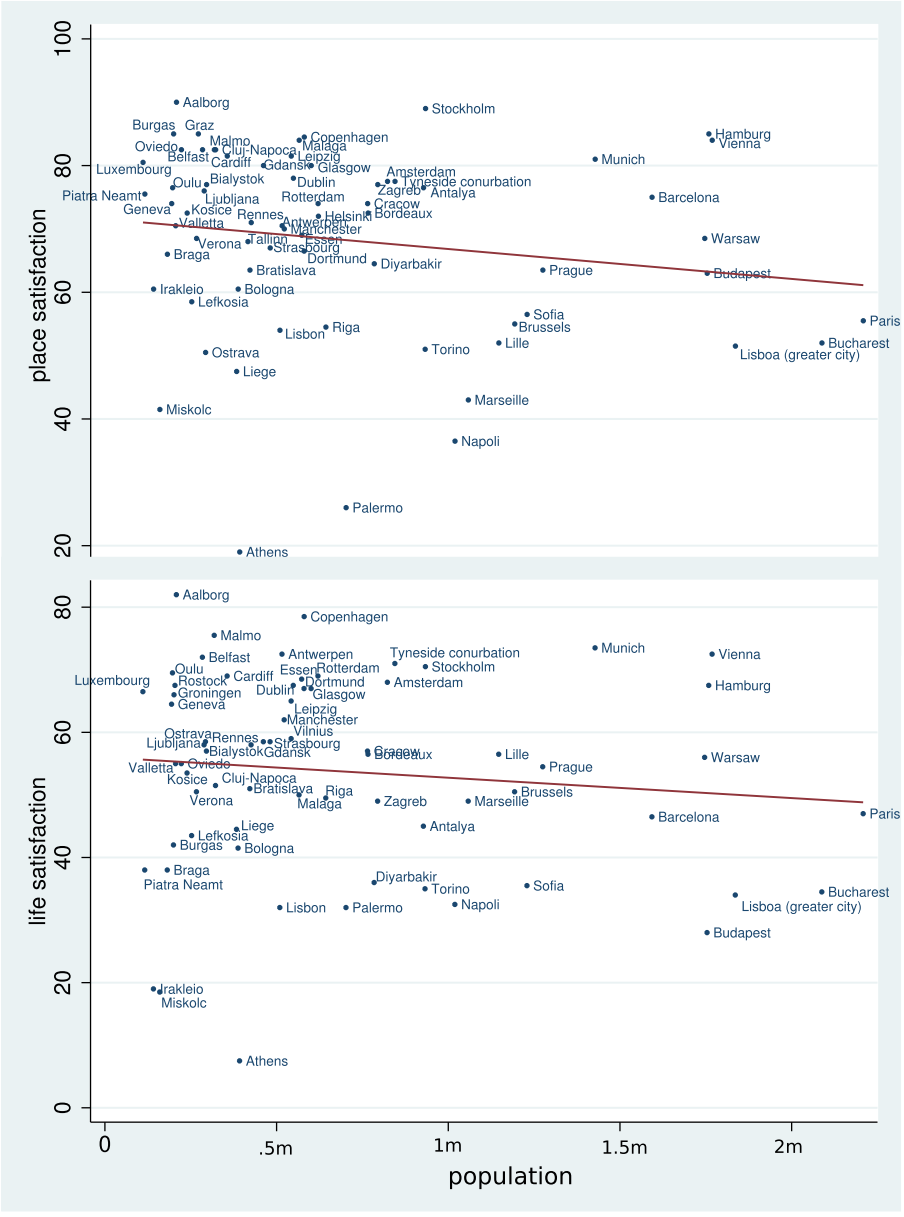

Fig. 5 SWB (place and life satisfactions) against population size. Linear fit is shown. Cities with population > 2.5 m were dropped so that city labels are readable, but graphs using all available observations are similar and shown in the Appendix. The population data was not available for the year of 2015 and were extrapolated from previous years using Stata 'ipolate' command with option 'epolate.' The relationship for the year 2012, when only a few observations were interpolated/extrapolated, are similar and can be found in the Appendix

a population > 2.5 m so that city names are readable (all data are shown in the Appendix). The relationships are less clear than in Fig. 3, and cities are not easily grouped. It is however important to show this weakly negative relationship because it runs counter to economic theory.

Conclusion

This study started with the hypothesis that Europe can be divided into regions: East vs. West and South vs. North. Our results confirm this hypothesis. Livability rises from the East to the West, and SWB rises from the South to the North. When combining both dimensions, the overall quality of life is lowest in the South-East and highest in the North-West.

These results contradict the urban economic paradigm of spatial equilibrium that claims that people cannot improve their SWB by migrating to other place (Glaeser et al. 2016). Clearly, both SWB and livability differ widely across European cities, and the free movement of European citizens allow for easy migration. Likewise, our results challenges the economic proposition that people are happiest in the largest cities (e.g., Glaeser 2011b; Glaeser et al. 2016).

The city embodies life chances. It is a person's habitat, where she works, lives, and uses various amenities. This study links these life chances, embodied in these European cities, to life results (SWB). More is sometimes better as we found with livability measured with the Mercer index, but more is not always better (Schwartz 2004), and this is what we found in terms of the size of a place. Our results show that SWB correlates with livability at about 0.6, concurrent with Oswald and Wu (2009)'s findings. The correlation of SWB with objective measures is in some way a confirmation of subjective measures, and it can work both ways: subjective measures can also be used to confirm objective measures. We found confirmation for the Mercer Index Ranking (though it still under-ranks small places), but not for the size of a place.

Subjective indicators do not replace, but complement objective indicators (Stiglitz et al. 2009). At the same time subjective indicators are in some ways more useful. Only SWB can be measured completely, while livability and QOL consist of innumerable items that cannot be measured fully (Veenhoven 2000), although economists recently tried in vain (Benjamin et al. 2014, 2015, 2017). The key advantage of using the SWB yardstick is that it overcomes the difficulty of measuring utility in social welfare, for instance, it helps answer the question of whether or not we should invest limited resources in parks, bike lanes, or waterfronts—for discussion see Diener (2009) and Okulicz-Kozaryn (2016).

This is the first study linking SWB with livability at the city level in Europe. Future studies, might explore this relationship in other regions[11] and continue to explore the complementary nature of using objective and subjective measures in happiness

[11] Research examining size of place and happiness in Latin America did not find a significant difference in happiness levels based on city size (Valente and Berry 2016).

studies. Also, future research might gain more insight by comparing changes over time, especially as more waves of data become available.

Discussion

We have found the Mercer Index to be substantially correlated with SWB as in Oswald and Wu (2009). Still, we argue that it is not the objective quality of cities but how people perceive them that ultimately matters as argued by Okulicz-Kozaryn (2013). It is the city on one's mind, and not the actual city on the ground that counts. As John Milton said, "the mind is its own place and in itself, can make a heaven of hell, a hell of heaven" (John Milton cited in Campbell 1981, p. 1). Using this metaphor, 'livable' (as per the Mercer Index) Paris is a "hell" (relatively low SWB), and 'unlivable' Belfast is "heaven" (high SWB).

What determines the actual (experienced) livability is what people feel, and not what exists in the real world. Subjective indicators directly tap quality of life as experienced (Schneider 2005). And there is a systematic difference between what we think to influence our quality of life and what actually does. Psychologists call this phenomenon expected versus experienced utility (Kahneman et al. 1997; Schkade and Kahneman 1998; Kahneman 2000; Kahneman and Krueger 2006). This is related to the cognitive theory of happiness, holding that SWB depends on perception of how life is (and in particular on the difference of that perception with how-life-should-be). In effect, the theory of happiness conscious perception is not always required. Needs can be gratified without knowing and still affect how well we feel, as is evidently the case with newborns. In the same vein, pollution can lower our happiness without a perception of pollution. Likewise, the availability of more choice options in a big city can affect happiness positively.[12]

Livability rankings of "best places" actually merely measure standard of living, and not the broadly understood quality of life.[13] There are city-level qualities, such as trust, tolerance, creativity, and so forth, that determine the overall quality of life and are yet left out from livability measurement.[14] These city-level qualities become more important in more developed areas such as in the majority of European cities studied here. There is also a "paradox of affluence" (Pacione 2003) illustrated earlier in Fig. 1—the more economic growth, the less economics matter.

Can selection explain our results? Perhaps. Big cities may attract relatively many unhappy people, such as singles, working age people, drop-outs and people with mental problems, who may live happier in the city than in the province (and moved for that reasons) but still decrease the average level of SWB in big cities.

[12] We are grateful to an anonymous reviewer for this point.

[13] The Mercer Index disclaimer states that: "One may live in the highest ranked city in terms of quality of living [standards] and still have a very bad quality of life because of unfortunate personal circumstances (illness, unemployment or loneliness, etc.").

[14] One could add them, but still there are virtually uncountable factors—and there is no point in attempting to include them all as some have attempted without success (Benjamin et al. 2014, 2015, 2017). And this is the advantage of using SWB, which captures everything that affects one's well-being.

But likewise, cities do arguably attract the best and the brightest, the most motivated and talented persons. Furthermore, since the vast majority of the population live in cities, the large majority of people are born and raised in cities. Thus, urban unhappiness is not due to sorting or selection, but rather due to the effect of city life—cities make people unhappy. For instance, in cities people are increasingly exposed to light, air, and information (marketing and advertising) pollution. Arguably, cities can also increase stress, overwork, and can magnify pecuniary and consumerist orientation. Selection or sorting would be easy to test, but not with data used here, therefore, this is left to future research.

Our results contradict economic theory, which by using solely a monetary yardstick of income or consumption, would argue that the place with the greatest income or consumption should have the greatest livability and subjective well-being. The richest or most expensive cities like London and Paris are not the most livable (as per the Mercer index), and do not have high levels of SWB. In fact, it is the other way around: London has the lowest SWB when compared to other cities in the UK (Office for National Statistics 2011; Chatterji 2013), similarly Helsinki in Finland (Morrison 2015), and Bucharest in Romania also have the lowest levels of SWB, and so forth—virtually all of the largest cities across Europe and the developed world, have the lowest subjective well-being levels in any given country (Okulicz-Kozaryn 2015b).

While unquestionably important, income (utility or economic welfare) is but one indicator in a list of many social and human factors that combine to explain one's overall happiness and choice of residency. Thus, given the intrinsic complexity of human choices and rationality (Shiller 2015; Zafirovski 2014; Akerlof and Shiller 2010; Ariely 2009; Kahneman 1994; Sen 1977; Thaler 2012; Thaler and Sunstein 2008; Kahneman and Thaler 2006), SWB research can gain significant insight by broadening its scope of analysis to multi-disciplinary approaches that are not solely theory-driven (Krugman 2012; Finance and Economics 2013). If livability is defined, for example, only as consumption or income per capita, then we would expect a positive correlation between livability and city size: the bigger the city, the higher the livability. Such definition is problematic, however, because it excludes other variables that determine livability. Incongruent results in the literature might be the product of studies with restrictive approaches and much can be gained by widening the scope of SWB analysis.[15]

Appendix

As a robustness check this appendix mostly repeats the analyzes in the body of the paper, but for the year of 2012 instead of 2015. The relationships are similar, however, life satisfaction values differ widely from 2012 to 2015—we have double checked with sources and this is indeed the case. We do not have an explanation for the large

[15] For example, while some researchers using multi disciplinary approach argue that high consumption and high urbanization reduce SWB (Kasser 2003; Frank 2012; Wirth 1938; Okulicz-Kozaryn 2015b), others using a more limited approach claim the opposite Glaeser (2011b) and Stevenson and Wolfers (2013).

Table 4 Pairwise correlations

Variables	Mercer	Population	Place satisfaction	Life satisfaction
Mercer	1.00			
Population	0.21	1.00		
Place satisfaction	− 0.54*	− 0.24*	1.00	
Life satisfaction	− 0.67*	− 0.09	0.61*	1.00

* $p < .05$

changes, and such discrepancy in such a short period of time (3 years) is troubling. However, we are confident in the analysis since the relationships are similar. For a discussion of some of the 2012-15 changes see O'Sullivan (2016).

Note that "London" here means the "Greater London Area"—this is probably what most people understand by "London." Other places are delineated by city limits. For a discussion refer to http://ec.europa.eu/eurostat/web/cities/spatial-units.

Table 4 repeats the correlation from the body of the paper for the year of 2012.

Fig. 6 SWB against the Mercer. Linear fit shown. Data for 2012

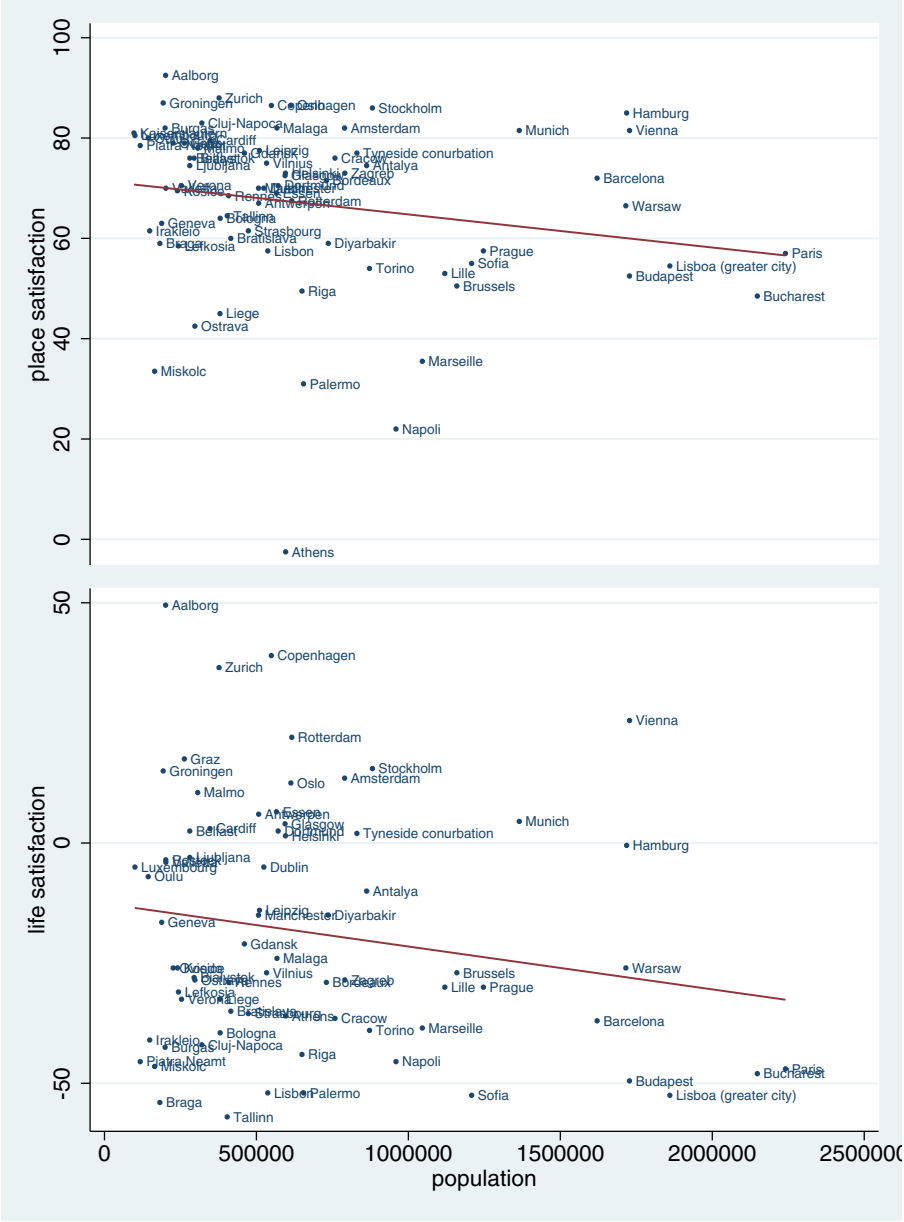

Fig. 7 SWB against population size. Linear fit shown. Data for 2012. Cities > 2.5 m are dropped so that city labels are readable; graphs using all available observations are similar and shown below. Some (13) population values were not available for 2012 and were extrapolated from previous years using Stata 'ipolate' command with option 'epolate.'

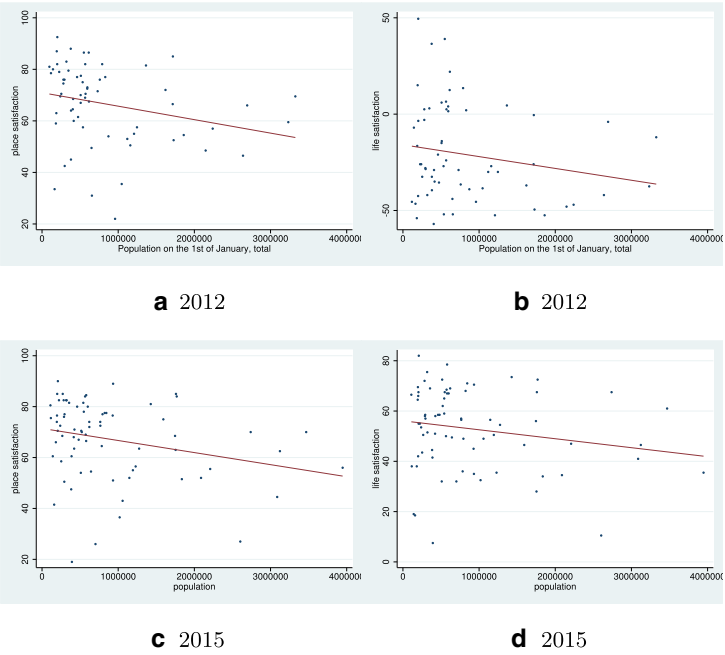

Fig. 8 SWB against population size. Linear fit shown. Cutoff at 4 m

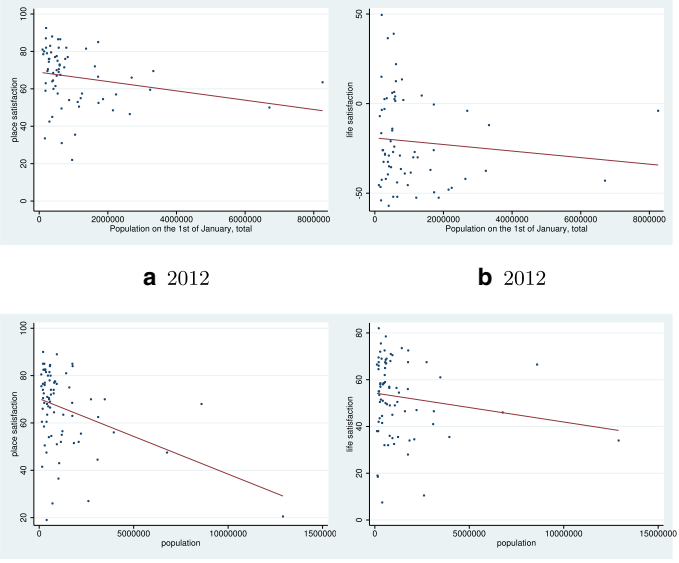

Fig. 9 SWB against population size. Linear fit shown. All data shown

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