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## For whom are cities good places to live*

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## Abstract

In this paper, we use survey data to examine heterogeneity in the urban gradient of subjective well-being. Are some sociodemographic groups more satisfied in cities than others? We find that young, single and childless persons with high income and education generally report higher levels of satisfaction in Norway's largest city, Oslo, compared to the rest of the country. These results may shed light on why the received literature has produced mixed results, as the sociodemographic composition of city

populations, as well as the surveys used to estimate urban gradients in subjective well-being, may vary.

# Introduction

There is an extensive research literature on the urban gradient of subjective well-being, i.e. whether life satisfaction/happiness and place satisfaction are higher in large cities, towns or rural areas (Wang and Wang 2016). For life satisfaction/happiness, the literature has produced mixed results. Some scholars find that life satisfaction/happiness is lower in large cities (Berry and Okulicz-Kozaryn 2011; Lenzi and Perucca 2016; Okulicz-Kozaryn 2017; Okulicz-Kozaryn and Mazelis 2018; Sørensen 2014; Winters and Li 2017). Others find no clear differences between urban and rural areas (Best et al. 2000; Easterlin et al. 2011; Florida et al. 2013; Glaeser et al. 2016; Shucksmith et al. 2009) or even higher life satisfaction in the city center (Millward and Spinney 2013). Glaeser et al. (2016) compare the urban happiness gradient across countries and conclude that persons in large cities tend to be happier in developing countries but not in developed countries, whereas Berry and Okulicz-Kozaryn (2009) find no evidence of an urban happiness gradient in low-income countries.

Fewer studies investigate the urban gradient in place satisfaction. The European Commission has conducted survey investigations of perception of quality of life in about 80 European cities (European Commission 2013; 2016). The surveys include

questions about both life and place satisfaction.[1] Analyses based on these surveys find a negative relation between population size and place satisfaction (Okulicz-Kozaryn and Valente 2019; Weziak-Bialowolska 2016).

Recently, Morrison (2020) has argued that low subjective well-being in some big cities is due to a compensation effect, the gap in well-being between the well-educated who receive high wages and can afford to live in attractive neighbourhoods and the less-educated often working in the non-tradable sector and who are forced to commute long distances: "the lower wellbeing of the larger number disadvantaged by residence in the large city counter the higher wellbeing of those who clearly benefit" (Morrison 2020). Corroborating evidence of this hypothesis is presented by Burger et al. (2020), who find that the urban-rural gap in life satisfaction in North America and Western Europe depends on income and education. People with high income and education level tend, on average, to be more satisfied with life in big cities.

In this paper, we examine in more detail how the urban-rural gap in subjective well-being depends on sociodemographic variables. We use three Norwegian survey data sets which together comprise approximately 200 000 respondents and a period of 25 years to

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[1] Life and place satisfaction are strongly correlated with a partial correlation coefficient of 0.75 (Okulicz-Kozaryn and Valente 2019).

explain the urban-rural gaps in life and place satisfaction as a function of age, sex, marital status, children, income, education level and immigrant status of the respondents. Urban scale is operationalized as a dichotomous variable equal to unity for the country's capital and largest city, Oslo, and zero for the rest of the country.

Our results are supportive of Morrison's hypothesis. We find statistically significant and sizeable interaction effects between the indicator variable of Oslo and personal characteristics of respondents. In general, young, single and childless persons with high income and education report higher levels of satisfaction in Oslo compared to the rest of the country.

The rest of the paper is organized as follows. In the next section, we discuss reasons why sociodemographic characteristics could affect the urban gradient in subjective well-being. The third section presents the survey data sets. Results are presented in the fourth section. This section also examines a potential weakness of geographical comparisons of subjective well-being, spatial variation in response scale usage, and shows that our conclusions are not affected by differences in response scale usage between Oslo and the rest of the country. The last section concludes.

# Literature and theory

Large cities exhibit both negative and positive features as places of residence for households. Compared to towns and rural areas, cities have a wide selection of goods and services, low transportation costs, a great variety of cultural amenities, inhabitants with a diversity of backgrounds and skills, and often beautiful architecture (Carlino and Saiz 2008; Glaeser et al. 2001; Glaeser and Gottlieb 2006). Also, cities can offer a range of educational services and promising career prospects. Although wages are higher in cities (Combes and Gobillion 2015; De la Roca and Puga 2017), so are house prices and rents, which serve to depress purchasing power. Other negative traits of the urban environment include crime, inequality, ghettoes, pollution, noise and traffic congestion (Berry and Okulicz-Kozaryn 2009; Okulicz-Kozaryn 2015; 2017; Okulicz-Kozaryn and Mazelis 2018; Okulicz-Kozaryn and Valente 2018).

The capital and largest city of Norway, Oslo, which we will compare to the rest of the country, has many of the positive and negative attributes that are standard for large cities. Oslo has an average income that is considerably higher than the country average and is the municipality with the second highest population share with higher education (Statistics Norway 2019a; 2019b). The city scores high on rankings of cultural amenities (Kommunal rapport 2018) and is ranked as a desirable place to visit (Lonely planet 2017). However, Oslo displays the most severe traffic jam problems in Norway

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(Tomtom 2018), has a relatively high level of air pollution (Norwegian Institute of Public Health 2015), and has the highest number of offences per capita (Statistics Norway 2019c). It has the highest population share of immigrants and a high share of households with low income (Normann 2009; Statistics Norway 2019d). Oslo also exhibits high and rising housing prices. In the span of 16 years (2002-2018), per square meter transaction price of villas rose by 184 per cent in Oslo, while the national consumer price index increased by 38 per cent (Statistics Norway 2019e; 2019f).

Several scholars argue that sociodemographic groups evaluate cities' positive and negative traits differently. Especially young, single, well-educated people with high income appreciate what cities have to offer (Clark et al. 2002; Costa and Kahn 2000; Florida 2002; 2017; Glaeser et al. 2001; Moos 2016; Okulicz-Kozaryn and Valente 2019). The existence of a wide range of amenities is particularly important to persons with high income and education (Adamson et al. 2004; Brueckner et al. 1999; Florida 2017; Lee 2010). Young people particularly appreciate high quality educational services, whereas the large number of people in cities makes it easier for single persons to find a partner – particularly for people with higher education that wish to partner up with well-educated individuals (Compton and Pollack 2007; Costa and Kahn 2000). Seniors prefer peace, slow quietness, comfortable climate and beautiful nature, which are typically found in rural locations (Chen and Rosenthal 2008; Dorfmann and

Mandich 2016; Jauhiainen 2009; Walters 2002). Of course, city amenities also matter for older persons, and many young persons care about the climate and nature amenities. Nevertheless, the positive traits of the urban environment are likely of higher value to young and single persons with high income and education, whereas the positive traits of rural environments are more important to older persons, families and people with lower income and education.

This conclusion is also valid when considering the negative aspects of city-dwelling. Air quality is generally better in rural areas than urban areas (Centers for Disease Control and Prevention 2017). Children (including in womb) and elderly are most vulnerable to disease and death caused by air pollution, and disability-adjusted life years (DALYS) lost from pollution-related diseases are heavily concentrated among infants and young children (Forouzanfar et al. 2016; Landrigan et al. 2018).

Safety is especially important for families with children and the elderly (Aner 2014; Clark 2003; Fokkema et al. 1996; Glaeser 2020). Damm and Dustmann (2014) and Chyn (2018) find that children growing up in high-crime locations are more likely to commit crimes as adults. Also, living in polluted environments during childhood seems to increase the likelihood of committing criminal offences later in life (Aizer and Currie 2019). Families with high income have the resources to sort into urban neighbourhoods

with low crime rates and pollution, whereas this option is not available for low-income families.

The wage structure and high housing costs of cities favour single people with high education (Morrison 2020). Autor (2019) shows that the urban wage premium for low-skilled persons has fallen in the USA due to growing demand for high-skilled workers in the service sectors. Also in Norway is the return to skills higher in cities, and especially in Oslo (Carlsen et al. 2016). Thus, compared to low skilled workers, high-skilled workers have relatively higher purchasing power in cities. Retired people don't benefit from a high wage level, and consequently this group may prefer to settle in areas with lower costs of living (Conway and Houtenville 2003). The high urban housing costs per square meter favour single persons with low space requirements. Couples, and especially families with children, demand more space, and the moderate costs of living in towns and rural areas are therefore a pull factor for them.

## Data

We use three different surveys that include questions about life satisfaction and/or place satisfaction. Questions about life satisfaction are included in two of the surveys, the Survey of Living Conditions (EU-SILC), conducted annually by Statistics Norway, and a survey conducted each second or third year during the last decade by the Norwegian

Government Agency for Administration and Financial Management (NGAAFM).

Questions about place satisfaction are included the NGAAFM survey and in a survey

carried out most years in the nineties and the early two-thousands by TNS Gallup.

All surveys include information about the respondent's age, sex, education level,

income, marital status, immigrant status and whether the respondent has children. Not

every survey has information about resident municipality, but from information about

county and city size, we were able to identify respondents residing in Oslo municipality.

The analysis is based on the sample of respondents 20 years and older that answered

questions about life and/or place satisfaction.

*EU-SILC survey*

EU-SILC is part of a collaborative effort organized by Eurostat and aims to provide

statistics on income, living conditions, welfare and social inclusion. Statistics Norway

collect the data by phone using computer assisted personal interviewing (CAPI)

methods. The surveys are made available for researchers, and we use data for the waves

in 2013, 2017 and 2018.[2] In these years the survey includes the following question on

life satisfaction:

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[2] EU-SILC is a panel survey where individuals are present in maximum four consecutive years. For this reason, some individuals are present in both the 2017 and 2018 surveys. To handle this issue, we cluster standard errors on individuals.

LifeSatisfaction1: "All in all, how satisfied are you with your life nowadays?"

Response alternatives were given as discrete numbers from 0 to 10, where 0 is 'very dissatisfied' and 10 is 'very satisfied'.

In each wave, a representative sample of approximately 12 000 of the population 16 years or older was drawn from the population registry, of which about 200 were not eligible because of death, emigration or residency at a public institution. In each wave, between 52 and 55% of the eligible sample responded. With the exception of family status, information on the respondents' sociodemographic characteristics are gathered from administrative registers, which reduces loss of observations. Self-reported family situation, a categorical variable describing combinations of age, single/married/cohabitation and children, is used to generate married/cohabitation status and the presence of children in the household.

Of the respondents in the 2013, 2017 and 2018 surveys, 93.7, 85.9 and 90.4% answered the question about life satisfaction, respectively. We pool the surveys, producing altogether 18,187 person-year observations. We omit 1,019 respondents that are below

the age of 20 or have missing information on income or family status, leaving 17,168

observations for the analysis.

*NGAAFM survey*

Since 2009, the NGAAFM has administrated five national surveys which included

questions about life and place satisfaction. The questions were:

LifeSatisfaction2: How satisfied or dissatisfied are you all in all with your life?

PlaceSatisfaction1: All in all, how satisfied or dissatisfied are you with your

municipality as a place to live?

For both questions, respondents were asked to choose integers on a seven-point scale

from 3 to -3, where -3 is 'very dissatisfied' and 3 is 'very satisfied'.

All surveys were drawn from random national registers with stratification on sex, age

groups and county. The first three surveys (2009, 2012 and 2014) were postal surveys,

whereas in 2017 and 2019, respondents were contacted mainly by e-mail. For the postal

surveys, 30 000 questionnaires were mailed, whereas 40-45 000 respondents received e-

mails in 2017 and 2019. The response rate was somewhat below 40% for the postal

surveys and around 20% for the e-mail surveys. Pooling the surveys produces a total of 50,831 respondents. Dropping 1,549 persons below 20 leaves 49,302 respondents 20 years and older, of which 47,621 (96.6%) answered the question about life satisfaction and 45,062 (91.4%) reported place satisfaction.

*TNS Gallup survey*

TNS Gallup conducted postal surveys annually from 1994 to 2000 and again in 2003 and 2005. The questionnaire includes two questions about place satisfaction. The first is identical to PlaceSatisfaction1, included in the survey conducted by NGAAFM. The other question is:

PlaceSatisfaction2: All in all, to what extent are you comfortable with living in your resident municipality?

Response alternatives for both questions are discrete numbers from 1 to 6, where 6 is 'very satisfied' and 1 is 'very dissatisfied'.

Each year, thirty to forty thousand persons received the survey, and about 50% returned the questionnaire. We pool the surveys, producing altogether 158,230 respondents. We omit 4,099 respondents below 20 years of age, leaving 154,131 respondents, of which

146,046 (94.8%) reported PlaceSatisfaction1, and 145,813 (94.6%) reported

PlaceSatisfaction2.

*Variable description*

Summary statistics are presented in Table 1. We rescale the answers to the questions

about life and place satisfaction in the NGAAFM and TNS Gallup surveys to make the

response scales identical to that of the EU-SILC survey, with 0 as least satisfied and 10

as most satisfied. We see that average satisfaction is quite similar in the two most recent

surveys (EU-SILC and NGAAFM) and lower in the oldest survey (TNS Gallup). The

NGAAFM survey is the only survey where questions about both life and place

satisfaction are included. Mean and standard deviation of answers to the two questions

are very similar.

[Table 1 about here]

For some of the respondent characteristics, the three surveys have identical definitions;

for others, definitions are similar but not identical. In all surveys, marital status is taken

from a question about whether the respondent is married or cohabitating. The questions

about children differ. In EU-SILC, presence of children means that the respondent lives

together with a child 19 years or younger. In the two other surveys, the respondent is

asked to state whether he/she has a child below 17 (TNS Gallup) or 18 (NGAAFM), independent of whether he/she actually lives with the child. Not surprisingly therefore, a higher share of respondents in the two latter surveys have children.

In EU-SILC, information about education level is taken from the national education registry. The respondent is considered to have tertiary education if he/she has completed one year of study after secondary education. In the other surveys, the variable is based on the answer to a question about the respondent's education level. The share of respondents with tertiary education is lower in the TNS survey, reflecting that the education level has increased over time.

Household income is added to EU-SILC from the national income registry, whereas the respondent chooses between alternative income intervals in the NGAAFM and TNS Gallup surveys. In these surveys we set household income equal to the mean of the lower and upper interval bounds except for the highest income category where there is no upper bound. In this interval, we set household income equal to the lower bound.

We define the respondent to be an immigrant if he/she is born abroad (EU-SILC and NGAAFM) or both parents are born abroad (TNS Gallup); information about birth country of respondent is not available in the TNS Gallup data set. In EU-SILC,

information about birth country is taken from the national population registry, whereas in the two other surveys, information about birth country and/or birth countries of parents is given by the respondent. We see that the share of immigrants is considerably lower in the TNS Gallup survey due to substantial immigration during the last decades.

In the EU-SILC and NGAAFM surveys, the share of respondents living in Oslo is close to the population mean. As TNS Gallup oversampled some small municipalities, the share of respondents living in Oslo is lower than the capital's population share. We conducted additional analyses weighting all observations to give each municipality the same weight as their national population share above 20. None of the conclusions were affected.

# Results

*Empirical specification*

We estimate OLS regressions explaining life and place satisfaction as a function of a dummy variable equal to one if the respondent lives in Oslo, sociodemographic characteristics of the respondent (age, male, marital status, children, tertiary education, income and immigrant status) and interaction terms between the Oslo dummy and the sociodemographic variables:

$$Satisfaction_{it}$$

$$= \alpha_0 Oslo_{it} + \boldsymbol{Sociodemographics_{it}} \times Oslo_{it}\boldsymbol{\alpha} + \boldsymbol{Controls_{it}\beta}$$

$$+ \epsilon_{it}$$

The parameter $\alpha_0$ gives how satisfied person *i* in the reference category is with life in

Oslo or with Oslo as a place to live relative to the rest of the country in year *t*. The

omitted categories of the sociodemographic variables define the reference category: 20

years old woman, native, without partner/husband and children, without higher

education, with average income. The parameter vector $\boldsymbol{\alpha}$ describes how satisfaction with

Oslo varies with sociodemographic characteristics. Controls include

sociodemographics, interaction terms between age (one-year intervals) and sex, and

year fixed effects. $\varepsilon_{it}$ is an error term assumed to have the standard properties.

For each of the satisfaction variables, we present two regressions. In the first regression,

all interaction terms between the Oslo dummy and sociodemographics are included; the

second regression only contains statistically significant interaction terms.

*Life satisfaction*

Table 2 presents regression results for life satisfaction. The two data sets that include

questions about life satisfaction produce quite similar results. Interaction terms with age

and tertiary education are significant in both data sets: satisfaction with life in Oslo relative to the rest of the country is decreasing in age and higher for persons with tertiary education. The coefficient for Oslo differs across the two samples, negative in the EU-SILC data set and positive in the NGAAFM data set, implying that persons in the reference category report lower life satisfaction in Oslo in the EU-SILC survey and higher life satisfaction in the NGAAFM survey.

[Table 2 about here]

Since the coefficients for the interaction terms between Oslo and age are negative, we can for each combination of the sociodemographic variables calculate an age cut-off where persons younger (older) than the cut-off value have higher (lower) life satisfaction in Oslo. The results for combinations of sociodemographics are displayed in supplemental material, Table A.1.

The results from the EU-SILC data set show that respondents without tertiary education have higher life satisfaction outside of Oslo independent of age, whereas respondents with higher education have higher life satisfaction in Oslo up to the age of 30. The results from the NGAAFM data set show that young people have higher life satisfaction

in Oslo, up to 41 years of age for those with tertiary education and up to 30 years of age

for those without tertiary education.[3]


*Place satisfaction*

Table 3 displays regression results for the three place satisfaction variables, one from

the NGAAFM data set and two from the TNS Gallup data set. The results for place

satisfaction are quite similar to those for life satisfaction, but more interaction terms

between Oslo and sociodemographic characteristics are statistically significant. In all

regressions, satisfaction with Oslo as a place to live relative to the rest of the country is

decreasing with age and persons with spouse/partner are less satisfied with Oslo. For

two of the three place satisfaction variables, we find that that persons with tertiary

education and high income are more satisfied with Oslo, whereas persons with children

are less satisfied. For one of the place satisfaction variables, we find that men are less

satisfied with Oslo compared to women.


[Table 3 about here]

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[3] In the NGAAFM data set the effect of age on relative life satisfaction in Oslo becomes positive at very high age intervals, which is most likely an artifact of the empirical specification.

For persons without tertiary education and with partner and children, Oslo is preferred only at very young ages or not at all (see supplemental material, Table A.1). For single and childless persons without tertiary education, the cut-off age varies between 24 and 56 years of age. For single persons without children and with tertiary education, the cut-off age is from 56 and above, indicating that most persons in this category evaluate Oslo as a better place to live than the rest of the country.

*Use of response scale*

Analyses of subjective well-being are based on the assumption that respondents use the same response scale. If respondents in different geographical areas use the response scale differently, comparisons of life and place satisfaction across areas may be biased. It is well-known that psychological traits vary geographically (Rentflow et al. 2008), and that reported subjective well-being is correlated with psychological traits (DeNeve and Cooper 1998; Diener et al. 1999). If, for instance, for a given level of place satisfaction, respondents in Oslo report a lower score than respondents in other municipalities, place satisfaction in the capital will be underestimated compared to the rest of the country.

The standard methods used to control for variation in response scale usage are repeated observations on individuals and vignette evaluations (King et al. 2004). Neither method

is applicable here as our survey data sets consist of cross-sectional samples, and vignette questions are not included in either of the surveys. Therefore, an alternative method proposed by Carlsen and Johansen (2004) is applied. The TNS Gallup data set includes a question about the local climate. By comparing answers to this question to an objective indicator of the quality of the local climate, we can obtain a proxy for the individual propensity to report a high level of satisfaction. This proxy for response scale usage is then included as additional regressor in the analyses of place satisfaction.

An objective measure of the local climate was created by the government commission that designed the present system for financing of Norwegian specialist health care (NOU 2008). Based on studies of geographic variation in consumption of specialist health services, the commission computed an index that runs from 0 to 1 where 0 denotes the `worst' climate and 1 the `best' climate.[4] The index assigns a unique value to each Norwegian municipality based on historical meteorological data (temperature by season, precipitation, and latitude).

The following question about the respondent's resident municipality is included in the TNS Gallup questionnaire:

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[4] The climate index used by the Norwegian government assigns 1 to bad climate and 0 to good climate. We have inverted the scale.

How satisfied/dissatisfied are you with the weather and climatic conditions?

As for the place satisfaction, respondents were asked to indicate a discrete number from 1 to 6 where 6 corresponds to `very satisfied' and 1 to `very dissatisfied'. We rescaled answers so that, like place satisfaction, the variable runs from 0 to 10. 132,207 respondents answered the question.

 [Table 4 about here]

The first column of Table 4 presents a regression explaining subjective evaluation of the climate as a function of the climate indicator used by the Norwegian government. The coefficient is highly significant (t ≈ 153) and large; going from the 'worst' to the 'best' climate increases respondents' average evaluation by 7.79, that is, spans almost 80% of the response interval. The residual from this regression is our proxy for response scale usage.

The second column of Table 4 repeats the regression of PlaceSatisfaction1 from the fourth column of Table 3; only respondents who evaluated both place satisfaction and the local climate are included, so the estimated coefficients are not identical to those of

Table 3. In the third column of Table 4, the residual from the regression in the first column has been included. The fourth and fifth columns repeat the exercise for PlaceSatisfaction2.

The residual has a positive effect on place satisfaction and is highly significant for both place satisfaction variables with t-values equal to 80 and 90, respectively. Hence, people that are inclined to evaluate the local climate positively, relative to objective climate conditions, are also inclined to report a high level of place satisfaction.

To evaluate the practical importance of variation in response scale usage, we compare the coefficients of Oslo and the interaction terms in the regressions without and with the proxy for response scale usage. None of the conclusions are affected. The coefficients change little, and none of the coefficients loose statistical significance. The coefficients of Oslo increase somewhat, indicating that persons in the reference category tend to underreport place satisfaction in Oslo, that is, Oslo respondents use a response scale slightly below the response scale used by respondents in other municipalities. In supplemental material, Table A.2, we display age-cut offs for the last four regressions of Table 4. It follows that most cut-off values are only moderately affected by inclusion of our proxy for response scale.

# Concluding remarks

A large literature investigates the urban gradient of subjective well-being. Are people happier in cities? Are cities perceived as good places to live? The results are mixed. A reason may be that sociodemographic groups evaluate life in the city differently, and the overall evaluation will then depend on the composition of the city population. For instance, cities with a young and well-educated population will, other things equal, score relatively high on subjective well-being. Results may also differ if the data sets used by various researchers exhibit distinct sociodemographic compositions.

Morrison (2020) argues that persons with high income and education prefer city life. Using a large data material, we examine in more detail how the urban-rural gap in subjective well-being depends on sociodemographics. We find that young, single and childless persons with high income and education generally report higher levels of satisfaction in Norway's largest city, Oslo, compared to the rest of the country.

Although our results indicate that the urban gradient in subjective well-being depends on a range of sociodemographic characteristics like life phase, family situation, education and income, with the data at hand, we are not able to determine which factors are of particular importance for each sociodemographic group. Our summary of the literature shows that there may be multiple factors at work. For instance, well-educated

persons may prefer cities because of urban amenities, higher wages, good career prospects and/or availability of suitable candidates for marriage matches. Mapping of preferences is an important agenda for future research on urban-rural gaps in subjective well-being.

Recent research shows that geographically mobile groups score relatively high on urban place satisfaction (Carlsen and Leknes 2020). The mobile groups overlap closely with those that report higher subjective well-being in Oslo. The relationship between geographical migration flows and subjective well-being is another promising avenue for future research and may provide insights into the urban-rural population dynamics.

**Declaration of interest statement**

The authors declare that there is no conflict of interest.

**Data availability statement**

The survey data are available under license from TNS Gallup, Statistics Norway and the Norwegian Government Agency for Administration and Financial Management. Contact the authors for access to Stata codes on model specifications.

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Table 1. Summary statistics

| | LifeSatisfaction1 | LifeSatisfaction2 | PlaceSatisfaction1 | PlaceSatisfaction1 | PlaceSatisfaction2 |
|---|---|---|---|---|---|
| | EU-SILC | | NGAAFM | | TNS Gallup |
| | (1) | (2) | (3) | (4) | (5) |
| Life satisfaction | 7.98 | 8.19 | | | |
| | (1.67) | (1.88) | | | |
| Place satisfaction | | | 8.11 | 7.04 | 7.65 |
| | | | (1.87) | (2.08) | (2.15) |
| Age | 49.9 | 51.3 | 51.3 | 48.1 | 48.0 |
| | (17.2) | (17.8) | (17.8) | (15.6) | (15.6) |
| Male | 0.52 | 0.49 | 0.49 | 0.50 | 0.50 |
| Married | 0.67 | 0.72 | 0.72 | 0.73 | 0.73 |
| Children | 0.31 | 0.39 | 0.39 | 0.37 | 0.37 |
| Tertiary education | 0.41 | 0.45 | 0.43 | 0.34 | 0.34 |
| Income  ($10^5$ 2019 NOK) | 5.97 | 6.62 | 6.60 | 5.61 | 5.62 |
| | (5.60) | (3.20) | (3.24) | (2.65) | (2.65) |
| Immigrant | 0.10 | 0.12 | 0.12 | 0.03 | 0.03 |
| Oslo | 0.13 | 0.13 | 0.13 | 0.04 | 0.04 |
| Years | 2013, 2017, 2018 | 2009, 2012, 2014, 2017, 2019 | | 1994-2000, 2003, 2005 | |
| N | 17,168 | 47,621 | 45,052 | 146,046 | 145,813 |

The table displays means and standard deviations (in parentheses).

Table 2. Life satisfaction in Oslo for sociodemographic groups

| Dependent variable: | LifeSatisfaction1 | | LifeSatisfaction2 | |
|---|---|---|---|---|
| Data source: | EU-SILC | | NGAAFM | |
| | (1) | (2) | (3) | (4) |
| Oslo | -0.2062 | -0.1706* | 0.3290*** | 0.1858** |
| | (0.1351) | (0.0931) | (0.0933) | (0.0774) |
| Oslo x (age - 20) | -0.0165* | -0.0044* | -0.0197*** | -0.0195*** |
| | (0.0099) | (0.0024) | (0.0057) | (0.0053) |
| Oslo x (age - 20)$^2$ | 0.0002 | | 0.0002** | 0.00022*** |
| | (0.0002) | | (0.0001) | (0.0001) |
| Oslo x male | 0.1452* | | -0.0055 | |
| | (0.0845) | | (0.0510) | |
| Oslo x married | 0.0785 | | -0.0684 | |
| | (0.0981) | | (0.0623) | |
| Oslo x children | 0.0680 | | -0.0041 | |
| | (0.1031) | | (0.0627) | |
| Oslo x tertiary education | 0.2453*** | 0.2188** | 0.1053* | 0.1328** |
| | (0.0878) | (0.0852) | (0.0579) | (0.0551) |
| Oslo x (income - mean(income)) | -0.0087 | | 0.0077 | |
| | (0.0094) | | (0.0099) | |
| Oslo x immigrant | -0.0052 | | -0.1074 | |
| | (0.1175) | | (0.0791) | |
| | | | | |
| Fixed effects: | | | | |
|   Age x Sex | X | X | X | X |
|   Years | X | X | X | X |
|   Sociodemographic controls | X | X | X | X |
| | | | | |
| Observations | 17,168 | | 47,621 | |
| R-squared | 0.0800 | 0.0795 | 0.0773 | 0.0770 |
| Adjusted R-squared | 0.0707 | 0.0707 | 0.0736 | 0.0736 |

LifeSatisfaction1: All in all, how satisfied are you with your life nowadays?

LifeSatisfaction2: How satisfied or dissatisfied are you all in all with your life?

Robust standard errors in parentheses. In columns (1)-(2), these are clustered on respondents.

*** p<0.01, ** p<0.05, * p<0.1

Table 3. Place satisfaction in Oslo for sociodemographic groups

| Dependent variable: | PlaceSatisfaction1 | | | | PlaceSatisfaction2 | |
|---|---|---|---|---|---|---|
| Data source: | NGAAFM | | TNS Gallup | | TNS Gallup | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Oslo | 0.1220 | 0.0244 | 0.4932*** | 0.5000*** | 0.2250** | 0.2416*** |
| | (0.0998) | (0.0759) | (0.0995) | (0.0604) | (0.1035) | (0.0687) |
| Oslo x (age - 20) | -0.0129** | -0.0071*** | -0.0154** | -0.0140*** | 0.0011 | |
| | (0.0060) | (0.0015) | (0.0064) | (0.0017) | (0.0064) | |
| Oslo x (age - 20)$^2$ | 0.0001 | | 0.00002 | | -0.00014 | -0.00012*** |
| | (0.0001) | | (0.0001) | | (0.0001) | (0.00003) |
| Oslo x male | 0.0213 | | 0.0375 | | -0.1105** | -0.1102** |
| | (0.538) | | (0.0516) | | (0.0535) | (0.0535) |
| Oslo x married | -0.1835*** | -0.1393** | -0.2355*** | -0.2338*** | -0.3839*** | -0.3837*** |
| | (0.0640) | (0.0569) | (0.0598) | (0.0593) | (0.0628) | (0.0629) |
| Oslo x children | 0.1412** | | -0.1880*** | -0.1960*** | -0.1588** | -0.1574** |
| | (0.0686) | | (0.0628) | (0.0611) | (0.0669) | (0.0666) |
| Oslo x tertiary education | 0.1939*** | 0.2302*** | -0.0070 | | 0.2740*** | 0.2743*** |
| | (0.0605) | (0.0575) | (0.0531) | | (0.0559) | (0.0558) |
| Oslo x (income-mean(income)) | 0.0102 | | 0.0330*** | 0.0334*** | 0.0345*** | 0.0347*** |
| | (0.0102) | | (0.0106) | (0.0102) | (0.0113) | (0.0111) |
| Oslo x immigrant | -0.0565 | | -0.2262 | | 0.0373 | |
| | (0.0860) | | (0.2083) | | (0.2188) | |
| Fixed effects: | | | | | | |
| Age x Sex | X | X | X | X | X | X |
| Years | X | X | X | X | X | X |
| Sociodemographic controls | X | X | X | X | X | X |
| | | | | | | |
| Observations | 45,052 | | 146,046 | | 145,813 | |
| R-squared | 0.0343 | 0.0339 | 0.0350 | 0.0350 | 0.0536 | 0.0536 |
| Adjusted R-squared | 0.0303 | 0.0300 | 0.0333 | 0.0333 | 0.0519 | 0.0519 |

PlaceSatisfaction1: All in all, how satisfied or dissatisfied are you with your municipality as a place to live?

PlaceSatisfaction2: All in all, to what extent are you comfortable with living in your resident municipality?

Robust standard errors are in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 4. Robustness tests of place satisfaction results by adjusting for individual response scale

| Dependent variable: | Satisfaction with climate | PlaceSatisfaction1 | | PlaceSatisfaction2 | |
|---|---|---|---|---|---|
| Data source: | TNS Gallup | TNS Gallup | | TNS Gallup | |
| | (1) | (2) | (3) | (4) | (5) |
| Climate index | 7.787*** | | | | |
| | (0.051) | | | | |
| Residual from (1) | | | 0.2340*** | | 0.2248*** |
| | | | (0.0026) | | (0.0028) |
| Oslo | | 0.5124*** | 0.5446*** | 0.2599*** | 0.2881*** |
| | | (0.0616) | (0.0595) | (0.0707) | (0.0691) |
| Oslo x (age - 20) | | -0.0141*** | -0.0144*** | | |
| | | (0.0018) | (0.0017) | | |
| Oslo x (age - 20)$^2$ | | | | -0.00011*** | -0.00011*** |
| | | | | (0.00003) | (0.00003) |
| Oslo x male | | | | -0.1346** | -0.0949* |
| | | | | (0.0554) | (0.0539) |
| Oslo x married | | -0.2490*** | -0.2498*** | -0.3901*** | -0.4003*** |
| | | (0.0610) | (0.0585) | (0.0650) | (0.0627) |
| Oslo x children | | -0.2997*** | -0.2173*** | -0.1654** | -0.1749*** |
| | | (0.0620) | (0.0594) | (0.0679) | (0.0657) |
| Oslo x tertiary education | | | | 0.2666*** | 0.2315*** |
| | | | | (0.0578) | (0.0565) |
| Oslo x (income-mean(income)) | | 0.0387*** | 0.0285*** | 0.0346*** | 0.0263** |
| | | (0.0104) | (0.0099) | (0.0113) | (0.0109) |
| Fixed effects: | | | | | |
|   Age x Sex | | X | X | X | X |
|   Years | X | X | X | X | X |
|   Sociodemographic controls | | X | X | X | X |
| Observations | 132,207 | 130,596 | | 130,368 | |
| R-squared | 0.1549 | 0.0337 | 0.1015 | 0.0486 | 0.1053 |
| Adjusted R-squared | 0.1548 | 0.0318 | 0.0997 | 0.0467 | 0.1036 |

PlaceSatisfaction1: All in all, how satisfied or dissatisfied are you with your municipality as a place to live?

PlaceSatisfaction2: All in all, to what extent are you comfortable with living in your resident  municipality?

Robust standard errors are in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Tab A1. Age intervals where respondent is more satisfied with Oslo

| | LifeSatisfaction1 | LifeSatisfaction2 | PlaceSatisfaction1 | | PlaceSatisfaction2 |
| --- | --- | --- | --- | --- | --- |
| | EU-SILC | NGAAFM | NGAAFM | TNS Gallup | TNS Gallup |
| | (1) | (2) | (3) | (4) | (5) |
| Without tertiary education, mean income, non-married, no children | No age interval | <31 | <24 | <56 | <54 |
| Without tertiary education, mean income, married, children | No age interval | <31 | <4 | <26 | No age interval |
| Without tertiary education, half-of-mean income, non-married, no children | No age interval | <31 | <24 | <50 | <37 |
| Without tertiary education, half-of-mean income, married, children | No age interval | <31 | <4 | <19 | No age interval |
| Tertiary education, mean income, non-married, no children | <31 | <42 | <56 | <56 | <79 |
| Tertiary education, mean income, married, children | <31 | <42 | <37 | <26 | No age interval |
| Tertiary education, twice-of-mean income, non-married, no children | <31 | <42 | <56 | <70 | <91 |
| Tertiary education, twice-of-mean income, married, children | <31 | <42 | <37 | <39 | <43 |

Note: The table displays age thresholds for men. Negative age thresholds values are marked - No age interval.

Table A.2. Age intervals where respondent is more satisfied with Oslo. Climate-adjusted results

| | PlaceSatisfaction1 | PlaceSatisfaction1 Climate-adj. | PlaceSatisfaction2 | PlaceSatisfaction2 Climate-adj. |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Without tertiary education, mean income, non-married, no children | <56 | <58 | <54 | <62 |
| Without tertiary education, mean income, married, children | <26 | <26 | No age interval | No age interval |
| Without tertiary education, half-of-mean income, non-married, no children | <50 | <53 | <37 | <53 |
| Without tertiary education, half-of-mean income, married, children | <19 | <20 | No age interval | No age interval |
| Tertiary education, mean income, non-married, no children | <56 | <58 | <79 | <83 |
| Tertiary education, mean income, married, children | <26 | <26 | No age interval | No age interval |
| Tertiary education, twice-of-mean income, non-married, no children | <70 | <69 | <91 | <93 |
| Tertiary education, twice-of-mean income, married, children | <39 | <37 | <43 | <15 |

Data: TNS Gallup.

Note: The Table displays age thresholds for men.  Negative age thresholds values are marked - No age interval.