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The evidence of urban-rural happiness gradient is mounting. urban unhappiness is common and some morrison stuff and couple others like 10 from that boilerplate in recent cities article about least happy places aroudn the world speicific cities but guess The urban-rural happiness gradient states that happiness raises from its lowest in largest cities to highest in smallest places, little towns, villages, and open country.

Yet all studies to date are cross sectional and panel evidence is missing. Few studies that use panel data do not actually test the gradient. Hoogerbrugge and Burger (????) use inadequate measurement, the urban-rural cutoff is at extremely low population size of 10,000 people or even 3,000 people for Scottland. Large villages and small towns are not really "urban" lacking defining features of urbanness: size, density, and heterogeneity Wirth (1938). The build envirnment in small towns lacks . The way of life lacks transitoriness, etc these words from city book. cite when metropolis is too big and urgan unhappiness is common–ideally it should be a gradient, and if necessarily a binary disctinction then it is several hundred thousand, not 3 or 10 thoudsand as in Hoogerbrugge and Burger (????).

White et al. (2013b) and White et al. (2013a) use British panel (BHPS) but test green space (such as gardens, parks, and proximity to coast) not size of a place. Similarly, Alcock et al. (2014) is a panel (BHPS) but also examining green space, not size of a place. Rehdanz and Maddison (2008) uses a German panel dataset (GSOEP), but without panel modelling techniques such as fixed or random effects.

1 Data and model

We use 2009-2019 psid from `psidonline.isr.umich.edu`, the reason being that swb question only started in 2009. from the family files we only retain household reference person (or head as it used to be called). This is the same practice as in (Brown and Gathergood 0).

the swb question reads: Please think about your life as a whole. How satisfied are you with it? Are you completely satisfied, very satisfied, somewhat satisfied, not very satisfied, or not at all satisfied? on scale from 1 (low) to 5 (high).

and the key independent variable is metro as defined in table 1.

TODO have cross corr here!!!! and summary stats (at least in app)

Race is important to control for–it is predicting SWB, and confounded with urbanicity; race–minorities are less happy and more in urban areas (Berry and Okulicz-Kozaryn 2011)

panel structure description of metro variable is shown in the appendix yes one problem is that tehre is little variability in urb-rur

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I thank Gordon D. A. Brown for sharing STATA code. All mistakes are mine.

metro	BEALE RURAL-URBAN CODE	Description
1	1	Metro - Counties in metro areas of 1 million population or more
1	2	Metro : Counties in metro areas of 250,000 to 1 million population
1	3	Metro : Counties in metro areas of fewer than 250,000 population
0	4	Nonmetro : Urban population of 20,000 or more, adjacent to a metro area
0	5	Nonmetro : Urban population of 20,000 or more, not adjacent to a metro area
0	6	Nonmetro : Urban population of 2,500 to 19,999, adjacent to a metro area
0	7	Nonmetro : Urban population of 2,500 to 19,999, not adjacent to a metro area
0	8	Nonmetro : Completely rural or less than 2,500 urban population, adjacent to a metro area
0	9	Nonmetro : Completely rural or less than 2,500 urban population, not adjacent to a metro area

Table 1: metro variable: Metropolitan/Non-metropolitan Indicator: This indicator is derived from the 2013 Beale-Ross Rural-Urban Continuum Codes published by USDA based on matches to the FIPS state and county codes: 1. Metropolitan area (Beale-Ross Code ER775923= 1-3); 0. Non-metropolitan area (Beale-Ross Code ER775923= 4-9). Each county in the U.S. is assigned one of the 9 codes.

controls are set in table **??** var_des in SOM

in controls we follow my cities when metropolis is too big (make sure we do):

race! cities more minorities and minorities less happy (berry US swb paper)

liberal democrat, rep con–cities more liberal/democract and democrats less happy my jap paper

it is impostrant to control for employment status–it both predicts swb, especially unmeployment has lasting negative effect on swb, and it also correlates with urbanicity as cities have more employment opportunities (e.g., O'Sullivan 2009).

boilerplate on ols

a standard fixed effects model is given by:

$$SWB_{it} = \gamma METRO_{it} X_{it} \beta + \alpha_i + u_{it} \tag{1}$$

Where

$METRO_{it}$ is a metro dummy for person i at time t

γ is the main coefficient of interest

α_i (i=1...n) is the unknown intercept for each person (n person-specific intercepts). SWB is the dependent variable (DV) where i = person and t = wave.

X_{it} is a vector of control variables

β is the vector of coefficients for control variables,

u_{it} is the error term

a standard random effects model is given by:

$$SWB_{it} = \gamma METRO_{it} X_{it} \beta + \alpha + u_{it} + \epsilon_{it} \tag{2}$$

u_{it} is between-person error ϵ_{it} is within-person error

a limitation of fixed effects model is that there are just 6 waves and tehre is limited variablility across time and hence time-invariant variables cannot be estimated, notably on metro which is not that often changed

2 Resuklts

by wave each cross section just have in app and refer briefly, and re; in body only fe

nice size effect like a third or half of hea

3 Conclusion and discussion

Supplementary Online Material (SOM)

[note: this section will NOT be a part of the final version of the manuscript, but will be available online instead]

3.1 Variables' Definitions

TODO !!!! from aok_var_des

3.2 Summary statistics

```
      id:  2, 3, ..., 14365                                  n =      10108
      yr:  2009, 2011, ..., 2019                             T =          6
           Delta(yr) = 1 unit
           Span(yr)  = 11 periods
           (id*yr uniquely identifies each observation)

Distribution of T_i:   min      5%     25%       50%       75%     95%     max
                         1       1       2         4         6       6       6
```

Freq.	Percent	Cum.	Pattern*
3179	31.45	31.45	111111
723	7.15	38.60	11
672	6.65	45.25	1
548	5.42	50.67	...111
505	5.00	55.67	..1111
502	4.97	60.64	1.....
481	4.76	65.39	.11111
480	4.75	70.14	111...
450	4.45	74.59	11....
2568	25.41	100.00	(other patterns)
10108	100.00		XXXXXX

*Each column represents 2 periods.

xtsum

xttab

3.3 Panel Structure of Metro Variable

```
xttab met
```

```
                  Overall             Between            Within
      met |    Freq.   Percent      Freq.   Percent        Percent
----------+-----------------------------------------------------
 Inap.:   |     8294     21.98       2947     29.26          77.39
 Metropol |    29436     78.02       8362     83.01          93.19
----------+-----------------------------------------------------
    Total |    37730    100.00      11309    112.27          89.07
                           (n = 10073)
```

```
xtsum met
```

```
Variable         |      Mean   Std. Dev.       Min        Max |    Observations
-----------------+--------------------------------------------+---------------
met      overall |   .7801749   .4141335          0          1 |     N =   37730
         between |               .385049          0          1 |     n =   10073
         within  |              .1878218  -.0531584   1.613508 | T-bar = 3.74566
```

References

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